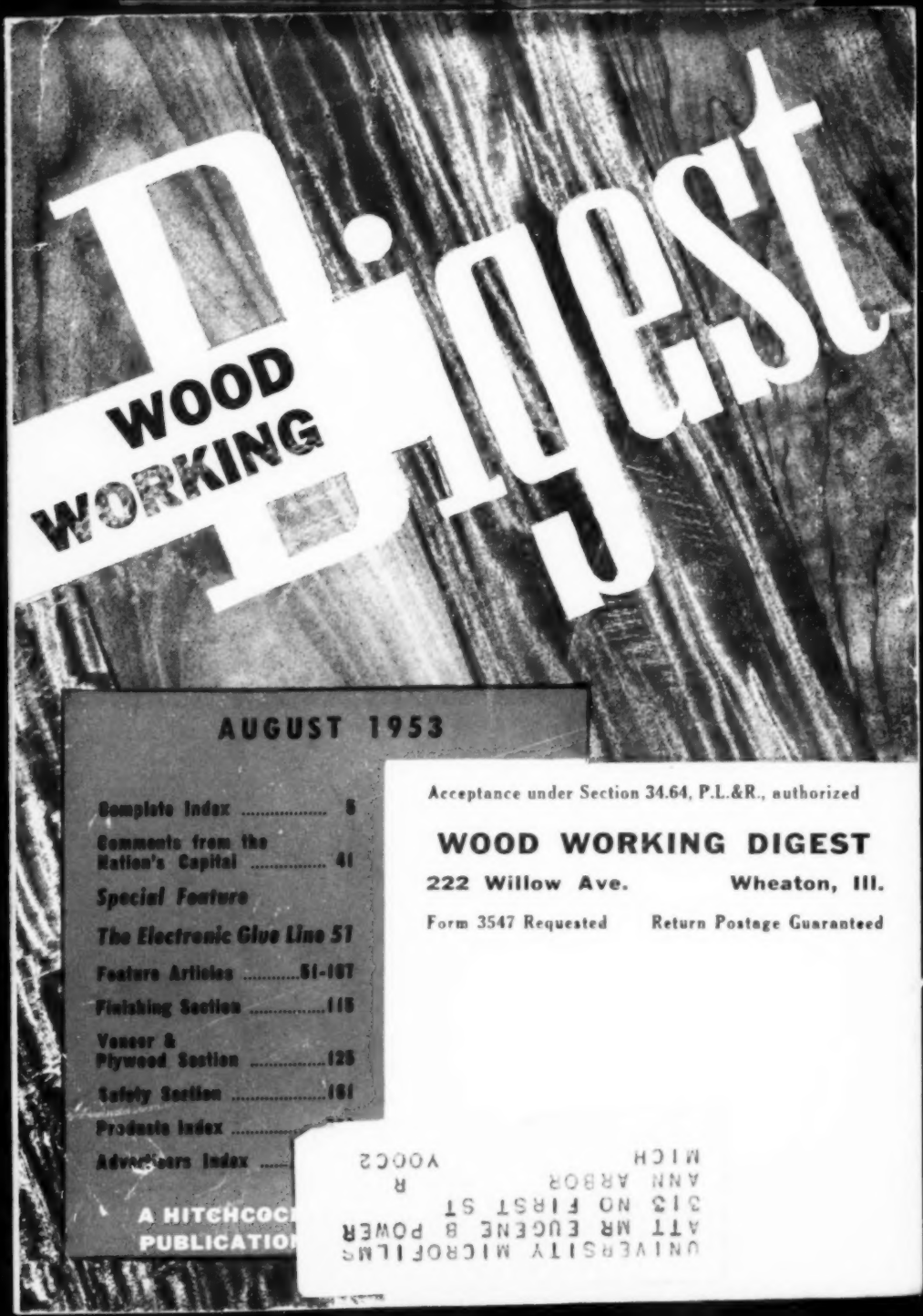

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A HITCHCOCK PUBLICATION

Acceptance under Section 34.64, P.L.&R., authorized

WOOD WORKING DIGEST

222 Willow Ave. Wheaton, Ill.

Form 3547 Requested Return Postage Guaranteed

UNIVERSITY MICROFILMS
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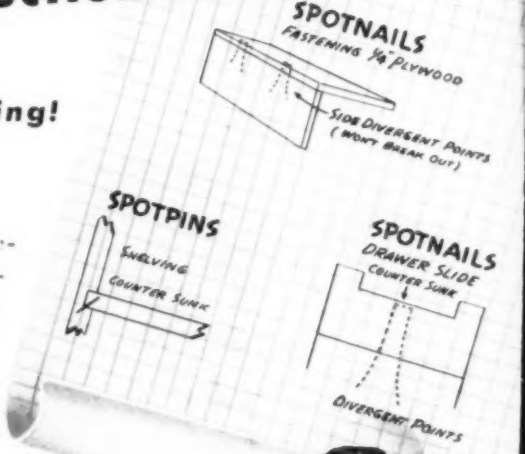
SPOTNAILS are improving furniture production methods

One shot no-split nailing!



THE SPOTNAILER

Light, portable, virtually indestructible nailing machine drives nail-like wire fasteners in sizes from 3/16" to 1⅛". Use Spotnails for fast, neat assembly of case backs, drawer bottoms and slides, panelling and dozens of other production fastening jobs.

THE SPOTPINNER

The familiar round 12 or 15 gauge sashpin in lengths up to 1¼" are now driven with one blow of a rubber mallet. Use Spotpins for pinning glued or unglued joints. Chisel points cut through grain of wood to avoid splitting. Flush driven or counter sunk without hammer marks.

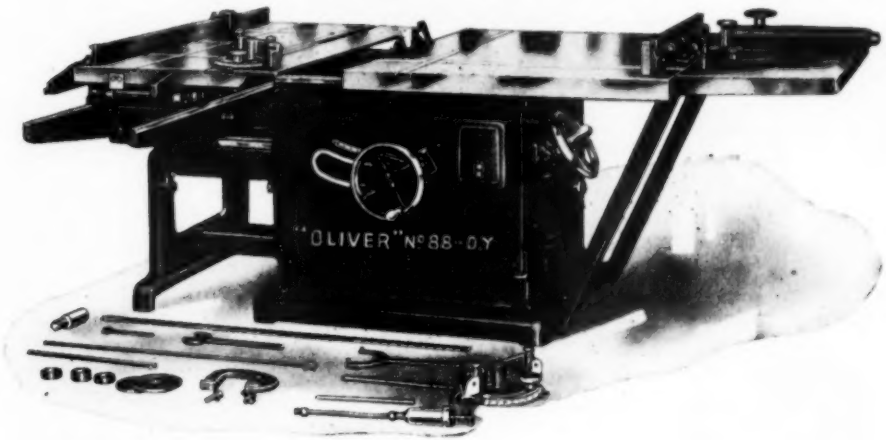
A trial in your own plant will prove our claims of better work—lower cost.

SPOTNAILS, INC.

EVANSTON 1, ILLINOIS

Those large, hard-to-handle panels . . .
saw them with ease and speed on

"OLIVER" WIDE CAPACITY MITER SAWS



6 models of large capacity

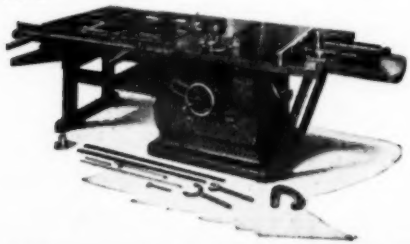
No. 88-DZ—Similar to No. 88-DY but without 18-inch table extension to right of saw.

No. 88-DW—Non-tilting arbor. Non-tilting table at right of saw with table extension. Rolling table at left of saw.

No. 88-DWL—Like No. 88-DW but having greater cross-cut capacity and larger rolling table.

No. 88-DX—Has large main table and table extension at right of saw. (Illustrated below.)

No. 88-DXL—Like No. 88-DX but having greater cross-cut capacity and larger rolling table.



If your operations call for the handling of stock of extra large dimensions, look into the advantages of the six "Oliver" Miter Saw Benches of large capacity. They produce smooth, accurate work with ease. The No. 88-DY (shown above) has a special rolling table to the left of the saw with 52" travel on V-shaped ball bearing ways, and an 18" extension at right of saw. Rips up to 50" wide. Cuts off up to 46" wide, 2½" thick; or 48" wide, 1" thick. Mechanical brake shuts off current. The arbor tilts up to 45°, and has 4½" vertical adjustment.

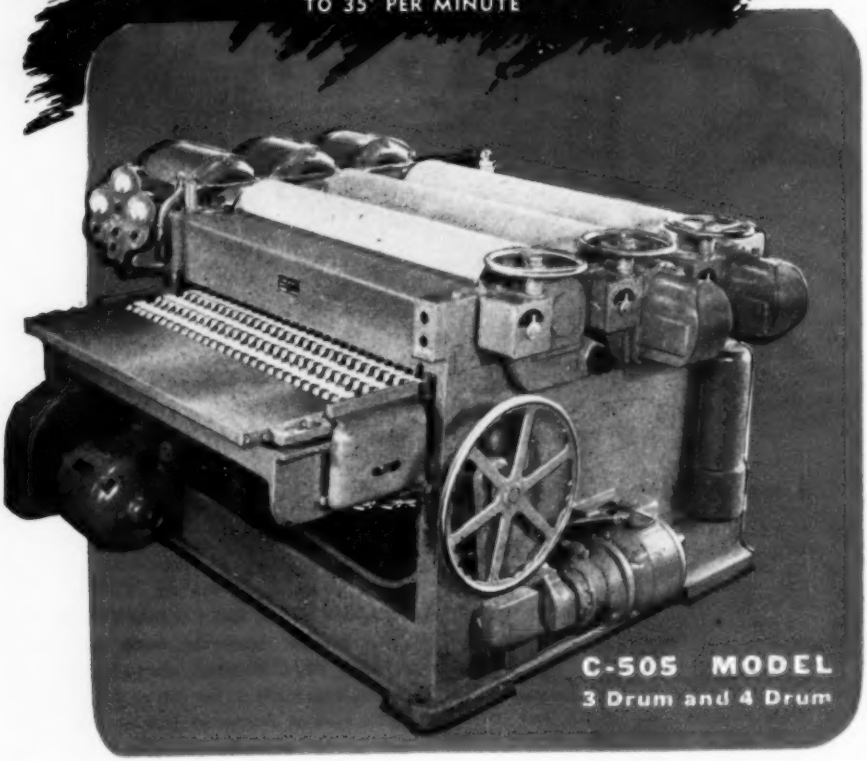
There's an "Oliver" Saw Bench to meet your needs best! Write today for details.

OLIVER MACHINERY COMPANY, GRAND RAPIDS 2, MICHIGAN

THE SMITH

ENDLESS BED SANDER

WITH SELF-OSCILLATING DRUMS
AND VARIABLE SPEED DRIVE, 12'
TO 35' PER MINUTE

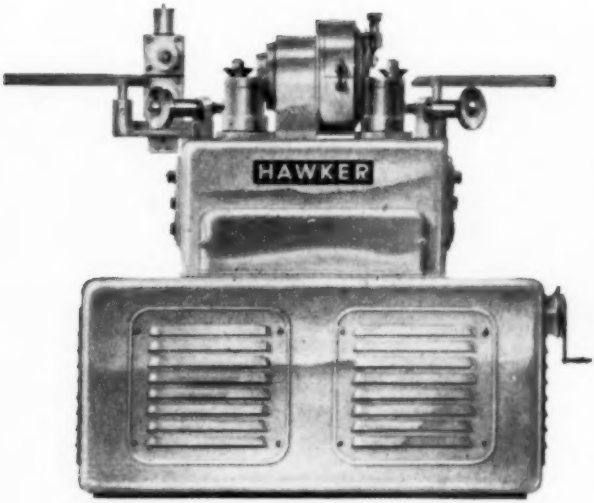


The self-oscillating drum (Patent pending) is the greatest improvement in drum sander construction in many years. Eliminates the multi-jointed, old style oscillator, with its bulky cover and separate motor drive. Operator now can get close to the machine for changing paper, etc.

Write today for descriptive literature

H. B. SMITH MACHINE CO.

SMITHVILLE, NEW JERSEY



waste less wood

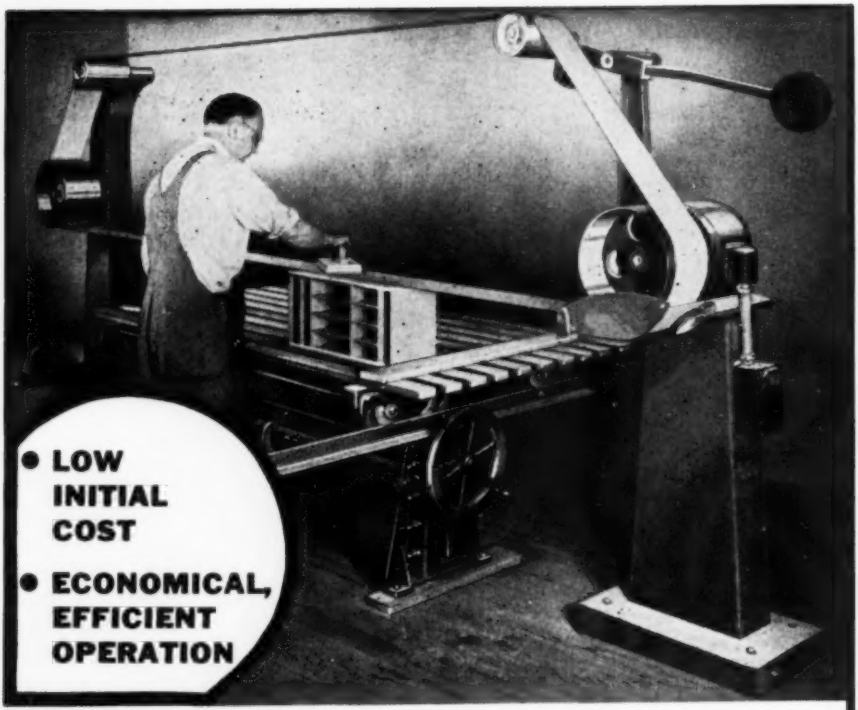
You can do just that two ways with the Model 1000 Hawker Rod and Dowel Machine. First, you will waste less wood because only a very small fraction of the rounds you turn will be malformed or damaged. Second, you will get full round, saleable dowels out of inferior stock, scrap trimmings, off size, or odd shaped squares.

The Model 1000 Hawker is truly a new production machine, with so many features they cannot be detailed here. But there is a completely detailed story about this new Hawker waiting for your request. Write for it today; you should not be without this information.

HAWKER **MANUFACTURING CO.**

1425 KEOWEE STREET, DAYTON 4, OHIO

MACHINES FOR THE NEW AGE OF WOOD



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- **ECONOMICAL, EFFICIENT OPERATION**

BEACH HAND BLOCK BELT SANDER

Used by more than 1000 leading industrial firms because of its economical efficiency and its versatility. For sanding and finishing wood products and for buffing products fabricated from aluminum, brass, bronze, stainless steel and plastics. Heavy steel construction.

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MONTROSE, PA.

WOOD WORKING Digest

AUGUST, 1953

Vol. 55, No. 8

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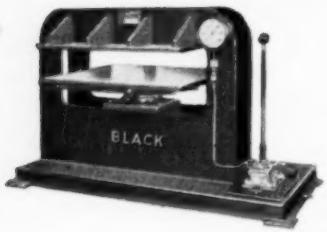
Presses

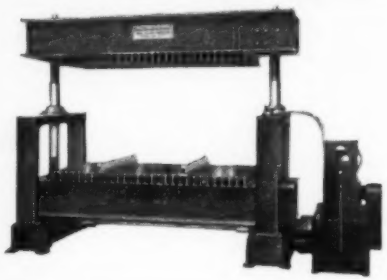


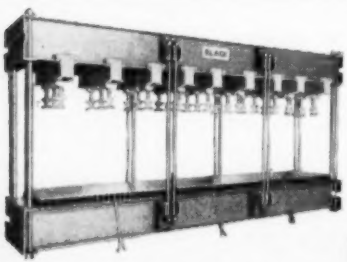
HYDRAULIC PRESSES

Black's hydraulic laminating press is designed for laboratory and experimental work or light production operation. Standard sizes from 1 to 12 or more square feet and pressures up to 100 tons. Now available with heated platens. Variations may be had in size of platens, vertical opening, length of stroke, total pressure applied, heated platens and fast closure arrangements. Write for Bulletin 11-P.

ELECTRIC PRESSES

Black's electric press is fast and efficient on laminating jobs which require moderate pressure, and has proved to be especially popular in the laminating of flush doors and plastic laminates. Here is a high production press at a low initial cost which will give continuous service with an irreducible minimum of maintenance and attention. Write for Bulletin 11-E.





HAND POWERED PRESSES

Black's all steel aircraft model press is stronger and more rigid than conventional presses . . . has wide flange main beams, double corner posts and multiple strain rods. Designed for compact installation requiring no blocking or pit. Offered in a complete range of sizes for every conceivable requirement. Also ten sizes of sectional press units are available. Write for Bulletin 11-G.

"If its gluing equipment—we have it"

write today . . .

THE BLACK BROTHERS CO., INC. 820 9th St., MENDOTA, ILLINOIS

"You can *always* count on quality work!"

With Jones & Orth cutter heads on the job everybody concerned is happy with the results — including the customers of the plant!

Jones & Orth users find that it is no trick at all to turn out a large daily output of consistently high quality, true-to-pattern work — with a minimum of maintenance and servicing expense.

Jones & Orth H-type cutter heads, such as the model illustrated, are unsurpassed for simplicity of design, perfect take-up for wear without change of pattern, and over-all economy. May we tell you more?

Write today for new catalog, and name of our dealer nearest you. Address either our Seattle or Memphis branch!

Need specially designed cutter heads? Let our engineers help! Write us in detail. Prompt service!

JONES & ORTH

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MEMPHIS 3, TENN.

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SEATTLE 14, WASH.

Borden's NEW CASCO-RESIN 5H LIQUID UREA RESIN GLUE...

Photo of press courtesy of Blair-Vermont Plywood Co.

...produces more panels per shift!

CASCO-RESIN 5H cures *faster* without sacrifice of pot life or assembly time . . . knocks costly minutes off hot- or cold-press curing cycles. Many plywood and panel makers have switched to CASCO-RESIN 5H for this one reason alone. But that's only one of the advantages of this new Borden urea resin glue.

CASCO-RESIN 5H also ends summer glue-storage problems because it stores over six months at 80° F . . . over 3 1/2 months at 90°. It's a high solids resin that saves storage space in drums or tanks. It up-grades your products with better water-resistance, particularly when extended with wheat flour. It's versatile, can be used for every type of urea resin gluing — hot-press, cold-press, R/F heating or continuous hot-plate edge-gluing machines. Shortens clean-up, because it's highly water miscible, flushes quickly from equipment.

Borden service men are demonstrating these advantages every day. Why not let them prove it in *your* plant? Just write or call and we'll set up a date. Address: The Borden Company, Chemical Division, Dept. WD-83 350 Madison Avenue, New York 17, N. Y. 2.3.3

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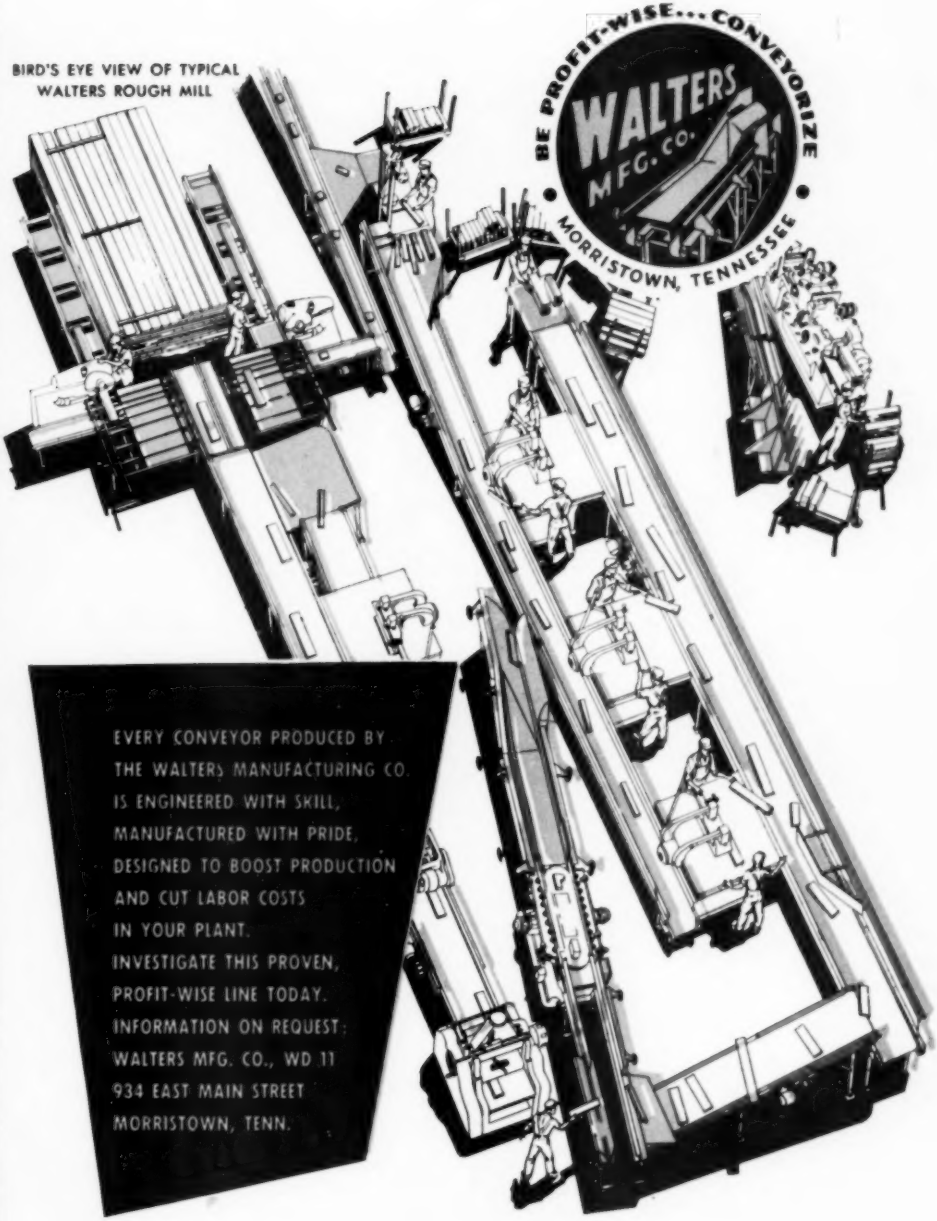
THE BORDEN COMPANY

Chemical Division

BIRD'S EYE VIEW OF TYPICAL
WALTERS ROUGH MILL



EVERY CONVEYOR PRODUCED BY
THE WALTERS MANUFACTURING CO.
IS ENGINEERED WITH SKILL,
MANUFACTURED WITH PRIDE,
DESIGNED TO BOOST PRODUCTION
AND CUT LABOR COSTS
IN YOUR PLANT.
INVESTIGATE THIS PROVEN,
PROFIT-WISE LINE TODAY.
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"I asked for a glue that would do the job— and I got it from Armour."

John Dombrowski, Superintendent, Oxford, Ltd., Chicago Plant

"For the exposed joints of our furniture, we need a clear, colorless glue line as well as a strong, permanent bond. I asked Bill Rich, my Armour salesman, if he had a glue that would do the job. He suggested Armour's Chrome Hide Glue. We tried it, it worked, and we've been using it ever since."

All through the woodworking field, men like Mr. Dombrowski have good reasons for specifying and using Armour glues. Armour's Chrome Hide Glue has unfailing high quality, an invisible glue line, light color and high tensile strength (10,000 to 12,000 lbs. per sq. in.). And Armour Chrome Hide Glue has a wide working range, since it is less affected than most adhesives by temperature and humidity. Unlike many newer types of glue, Armour Chrome Hide Glue never shows cold flow. Unvarying from batch to batch, it is always high in quality, assuring continuously uniform working conditions.

Armour Chrome Hide Glue is only one of a complete line of Armour woodworking adhesives, including polyvinyl resin emulsions. Get in touch with Armour today for current prices.

ARMOUR *Adhesive Division*

Armour and Company • 1355 West 31st Street • Chicago 9, Illinois
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LET'S FACE IT . . . IMPROPERLY-DRIED LUMBER PRODUCTS JUST WON'T SELL!

● With today's net profit on most unit sales at an all-time low, every woodworking operator knows it's more important than ever to increase production, eliminate waste of lumber and labor, and improve the good will of his customer.

Protect YOUR profits! Rely on STANDARD DRY KILN'S internal fan construction and automatic reversible cross-recirculation for faster, more uniform drying under exact conditions throughout every kiln load. *Rely on STANDARD to cut operating costs!* Whether you need a single unit, a full battery of kilns, or need to remodel your old natural draft installations for maximum profit-building results, get the facts . . . and you'll get STANDARD!

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Write for Illustrated Standard Catalog

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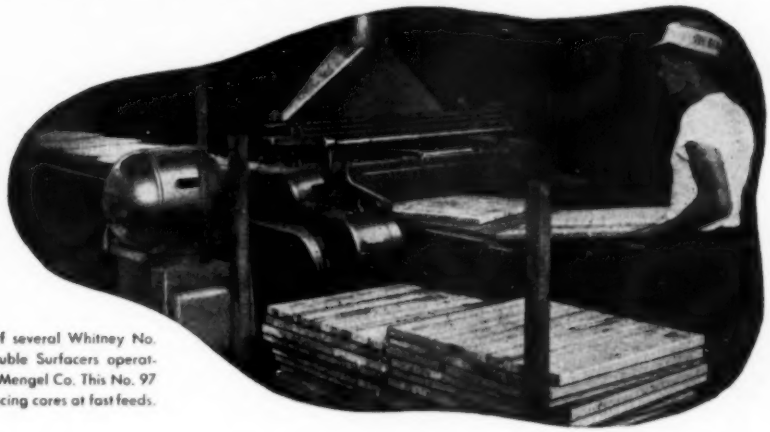
The Mengel Co. reduces planing costs with Whitney No. 97 Double Surfacers



One of several Whitney No. 97 Double Surfacers operating at Mengel Co. This No. 97 is surfacing cores at fast feeds.

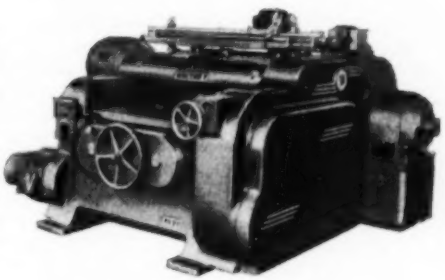
"Our Whitneys operate continuously, day after day, with a minimum of service and attention".

Says **R. F. Wilder, Plant Manager, Furniture Division**

The Mengel Company is thoroughly sold on Whitney No. 97 Double Surfacers for their high quality planing, continuous production and low upkeep. They are able to save considerably in other departments also, due to the excellent performance of these surfacers.

Whether for your finest cabinet planing, dimension stock, general millwork or cores, Whitney No. 97 Double Surfacers can improve the quality of your planing, lower your costs and pay big dividends on your investment. Investigate today. Write for complete information.

Ask for Planer Bulletin D8



Whitney No. 97 Double Surfacer
Feeds, 30-90 ft. per minute. Planes stock, 1/16" to 7" thick. Widths, 30", 36", 40" and 44".

In Our 116th Year

BAXTER D. WHITNEY & SON, Inc.
Planer Specialists for more than 100 years
WINCHENDON, MASSACHUSETTS, U. S. A.

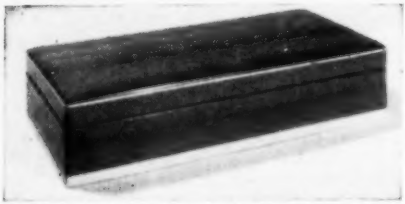
PLAN IT BETTER ON A WHITNEY

PLANERS • SHAPERS • AUTOMATICS • VARIETY SAWS • BACK KNIFE LATHES

MOST USEFUL WOOD *in America . . .*

BY EVERY standard for a good commercial wood—dimensional stability, workability, strength, insulating value, paint retention, glue-holding power, durability—California Redwood rates high. In fact, compared with the other woods in greatest production, Redwood tops them all in "box score" of desirable characteristics.

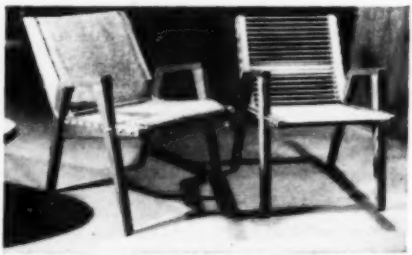
JUNIOR COOLING TOWER for home air-conditioning plant, in which water is cooled by dripping down series of Redwood louvres. Even under such extreme heat and moisture conditions, Redwood resists shrinkage, decay, warping.



CIGARETTE BOX of polished Redwood. A natural humidor of unusually attractive appearance, Redwood finds high favor with tobacco and food packagers, novelty and box manufacturers.

That's why so many woodworking plants all over America use Redwood either as the exclusive, or as an important, material in their finished products.

Three of these products are pictured here, to demonstrate Redwood's wide application in the woodworking field. To find out how Redwood can help you in *your* line, write the California Redwood Association, 576 Sacramento Street, San Francisco 11, California.



"MAKE IT YOURSELF" CHAIRS of Redwood and rope show wood's easy workability, strength and beauty of grain and color.

An information center for Redwood, the Association includes thirteen leading Redwood lumber mills: Union Lumber Co., Warm Springs Redwood Co., Willits Redwood Products Co., Wolf Creek Timber Co., Inc., Arcata Redwood Co., Coastal Plywood & Timber Co., Eureka Redwood Lumber Co., Hammond Lumber Co., Holmes Eureka Lumber Co., Northern Redwood Lumber Co., Pacific Lumber Co., Rockport Redwood Co., Simpson Logging Co.

This installation at Ply Curves, Inc. takes only one-fourth the floor space required by conventional equipment. The set-up makes short production runs economically practical.

With the Thermex 3-KW Bonding Equipment you can cut costs on many bonding operations. It's compact and portable. Time is saved by a dual-load switch . . . while one load is being bonded, the other can be prepared.

Simplifies dies for short runs

THERMEX* Bonding Equipment permits the use of inexpensive wood dies, overlaid with copper electrodes. This greatly simplifies tooling up for short runs. This equipment bonds and cures assemblies in a minute or two, permitting volume production in a small area, with a minimum of labor. Have a Thermex field engineer study your operations and make recommendations. Write The Girdler Company, Thermex Division, Louisville 1, Kentucky.

*THERMEX—Trade Mark Reg. U.S. Pat. Off.

Choose Thermex Bonding Equipment for:

EDGE-BONDING LUMBER • FABRICATING ASSEMBLIES • BONDING PLYWOOD
BONDING PANELS-TO-FRAMES • MOLDING LAMINATED PARTS

The **GIRDLER** Company

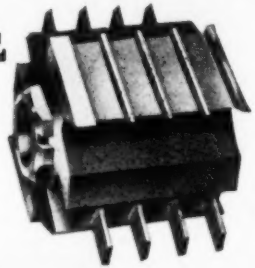
A DIVISION OF NATIONAL CYLINDER GAS COMPANY
Thermex Division

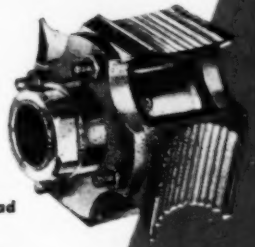
the CORRECT* *line of*
CUTTERHEADS

MILLED-TO-PATTERN BITS AND KNIVES

Round Head

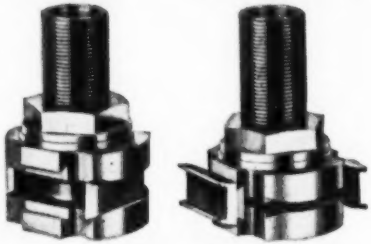
Moulding and Splitting Head



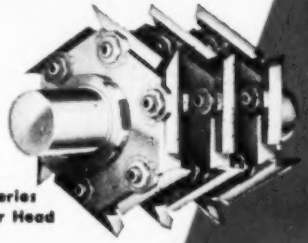


Vise Grip Head

Surfacer Cylinder



Combination Shaper Heads

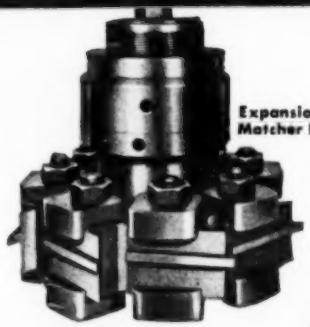


200 Series Beader Head

here's why —

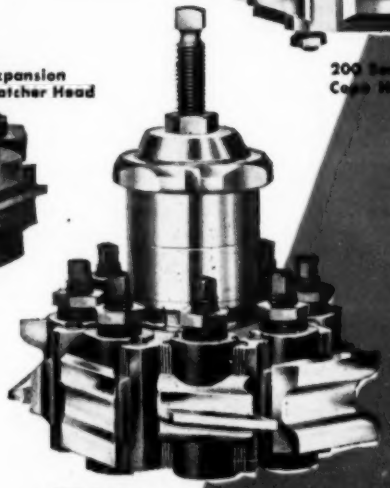
Yates-American engineers combine actual field study and years of experience to produce the CORRECT cutterheads — *cutterheads engineered for the particular job.* Y-A offers a complete line — not just one cutterhead to fit all needs.

Specify Yates-American cutterheads, knives, and milled-to-pattern bits —



Expansion
Matcher Head

200 Series
Cope Head



200 Series
Side Head

Many patterns available in stock at all Y-A branch offices. Write today for complete literature.

Y-A THIN KNIVES

are quality all the way . . . preferred for long satisfactory service because they are made of the finest selected cutting steel, accurately ground, with controlled heat treating. Get the best . . . specify Y-A Thin Knives!

Yates-American

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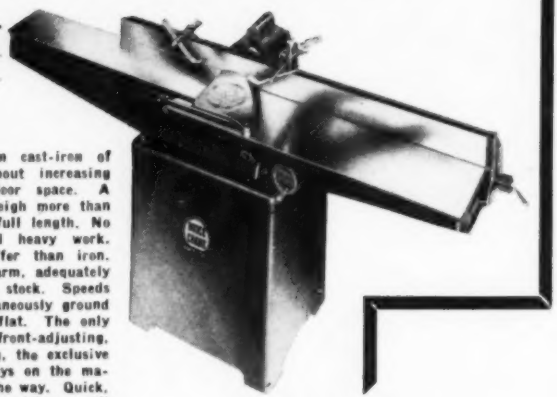
8" and 6" Welded All-Steel LONG-TABLE JOINTERS

Strength, Permanent Accuracy and Alignment impossible with bolted-up cast-iron construction.



Steel tables (3 times stronger than cast-iron of same thickness), are extended without increasing width, thickness, weight. Saves floor space. A comparable cast-iron jointer would weigh more than twice as much. Tables undergirded full length. No springy overhanging tables to spoil heavy work. Steel is actually 2 to 3 times stiffer than iron. The entire infeed table is a rabbet arm, adequately supporting narrow rabbeting on wide stock. Speeds up to 5500 r.p.m. Tables are simultaneously ground flat—parallel to closest limits—stay flat. The only long-table jointers with full-length, front-adjusting, double-locked fences. When rabbeting, the exclusive guard on all Boice-Crane jointers stays on the machine—simply turn and swing out of the way. Quick, positive, micrometer-accurate knife setting. All knives cut the exact same depth within .002" to .003"—a new standard for perfect work without chatter marks . . . better finish . . . smoother operation. 3¼-inch dia. head, 20% larger than conventional 6-inch jointers, plus improved cutting angle. Controls, locks, direct reading depth scale and switch easily used in comfortable, normal operating position. New rotor-on-cutterhead or V-belt drives optional.

Boice-Crane offers a complete line of job-rated jointers—

Model No.	Size	Without auxiliary feeding aids, recommended for stock lengths to	Length being a factor, recommended for stock sizes to	Planes boards and panels to	Fence	Depth of cut	Cutterhead diameter	Cutting arc diameter
3400 Steel	8"x84"	8 ft.	8"x8"	16" wide	65"x4"	⅝"	3¼"	3⅜"
2400 Steel	6"x60"	6 ft.	6"x6"	12" wide	48"x4"	½"	3¼"	3⅜"
1400 Cast-Iron	6"x36"	4 ft.	4"x6"	12" wide	33"x3⅜"	⅛"	2¾"	3"

BOICE-CRANE COMPANY
931 CENTRAL AVENUE TOLEDO 6, OHIO

Please send free literature on Boice-Crane Jointers

NAME_____

STREET_____

CITY & STATE_____

BOICE CRANE — FOR 40 YEARS AMERICA'S MOST IMITATED POWER TOOLS

AVAILABLE NOW!

through industrial supply distributors in most cities. No long waits for delivery. High quality, low cost tools for cutting, shaping, drilling finishing wood, fibre, metals and plastics.

SKARIE HAS IT!

IMMEDIATE DELIVERY!

Subject to prior sale

YATES-AMERICAN
J-180
18" X 6" SURFACER

Call or wire collect!

SKARIE INCORPORATED

707 N. Howard Street, Baltimore 1, Md., LExington 9-6000

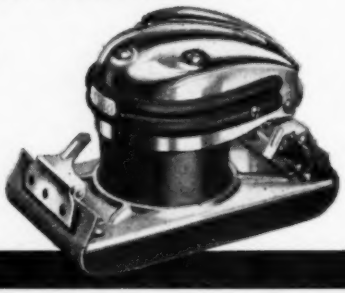
SKARIE
OF BALTIMORE

NATIONAL SANDERS

FOR RAPID STOCK REMOVAL . . .

MODEL 400

ORBITAL ACTION
AIR DRIVEN
SINGLE PAD



FOR FINISHING WITH THE GRAIN . . .

MODEL 600

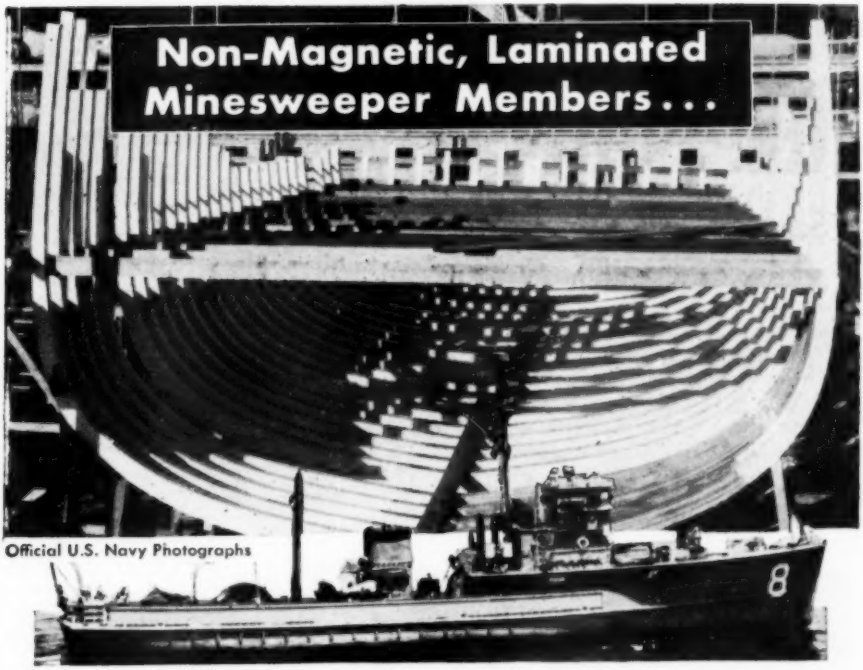
STRAIGHT LINE ACTION
AIR DRIVEN
SINGLE PAD

AND FOR EVERY FINISHING OPERATION!

National offers a complete line of air or electric driven sanders with both orbital and straight line action. If you want to increase production while doing a better finishing job, see your National jobber.

Write for our new catalog today!

NATIONAL AIR SANDER, INC.
2820 AUBURN ST. • ROCKFORD, ILL.



bonded with Penacolite® Adhesives for outstanding strength and performance

● The very nature of their service demands that U. S. Navy minesweepers be constructed of durable, non-magnetic materials. Wood has been chosen for the structural members of these ships, and Penacolite Resorcinol Adhesives are proving very popular in bonding the laminated timbers.

Resilient laminated wood members prove much more shock resistant than *solid* timbers . . . and are stronger, size for size. Larger timbers are possible through lamination than could be fashioned from the largest trees available. They do not require long seasoning time and are easier to shape. The use of laminated members reduces the necessary number of fastenings and joints in the frame of a ship, too.

When fully cured, Penacolite Adhesive bonds are *permanent*. They remain as strong as the woods they join through temperatures ranging from −40° C. up to charring heat, and are not weakened by shrinking or swelling even under exposure to corrosive sea water.

Let us analyse *your* bonding problem and recommend the right Penacolite Adhesive for your particular job. No obligation.

KOPPERS®

KOPPERS COMPANY, INC.

Chemical Div., Dept. WWD-83, Pittsburgh 19, Pennsylvania

PENACOLITE® RESORCINOL ADHESIVES

The original resorcinol, waterproof, room-temperature-setting adhesives

NEW

Red-I-Cut-"L"®

Sands the hard synthetics...
...FASTER, with less work!

Spar varnish used to be the "toughie" in finishes, but some of the modern synthetics make it look like a weakling... especially when you have to sand them! But CARBORUNDUM's new RED-I-CUT-"L" Waterproof Paper is designed to take on the toughest of them... to sand them quickly, easily, economically.

RED-I-CUT-"L"

(the "L" means lacquer) Waterproof Paper

...CUTS FAST
...RESISTS SOLVENTS
...LESSENS LOADING

It lasts up to 25% longer than other papers because the special bond that holds the grains to the tough backing prevents excessive loading... lets the grains cut more freely for a longer period of time. There's no need to soak it before use. It holds size and shape when wet.

YOUR CARBORUNDUM DISTRIBUTOR or salesman will arrange a test of new RED-I-CUT-"L" Waterproof Paper on your own finishing line. Phone him today! He's your expert consultant for every sanding and finishing problem.

Or, if you prefer, write to the Carborundum Company, Dept. WD 82-324, Niagara Falls, N. Y.

CARBORUNDUM

REGISTERED TRADE MARK

The ONLY source for EVERY abrasive product you need

LABOR . . . EQUIPMENT RELATED FACTORS IN PROFITABLE VENEER PRODUCTIONS

The necessity of raising productive output in a decreasing labor market has resulted in a demand for greater performance being placed on machinery and equipment. Manufacturers of machinery must take cognizance of these related factors and build their equipment to meet the increased demands for ruggedness and dependability. Design standards must stress simplicity of operation so that green labor can operate them for maximum profit.

Selecting equipment that will meet these increased demands places a great responsibility on the man who specifies and selects new plant equipment. More and more of these men rely on the experience of Merritt-Solem to produce the machinery that will meet today's requirements.

An example of Merritt-Solem's leadership is the M-25 lathe illustrated. This lathe combines simplicity of operation and extreme ruggedness that makes it ideally suited for operation by inexperienced operators. Every point of wear has been fully protected for smooth operation and long life at full capacity. Merritt-Solem machinery is tailored to fit your individual requirements. An experienced engineering staff is at your service to solve every machinery problem.

For every type of veneer and plywood machinery contact Merritt-Solem.

The M-25 Veneer Lathe is available in knife lengths of 54" to 126" and swings of 42", 54" or 60".

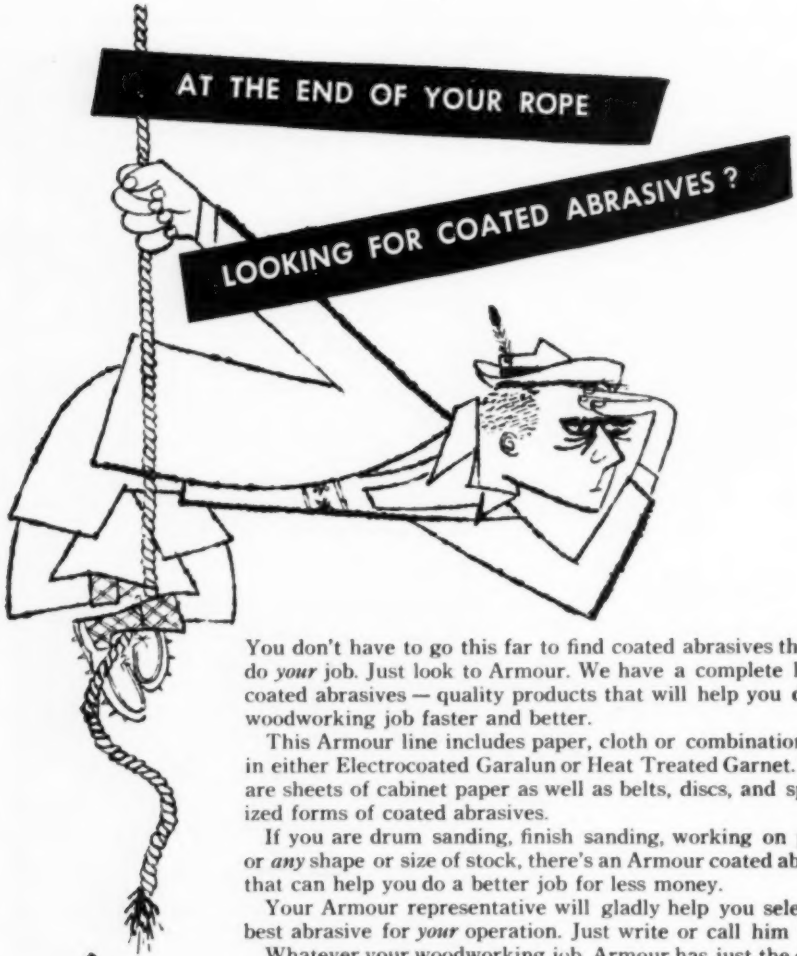
Construction features of the M-25 that insure long life with minimum maintenance include an all welded steel base. Feed Screws and Feed Shafts are supported in tapered Timken Roller Bearings. Welded steel knife carriage has adjustable as well as replaceable trunion ends. Main Drive Gears are helical spiral for extra long life and even thrust distribution. Spindle Sleeves revolve in bronze journals and are extra long to give maximum support to spindles.

MERRITT - SOLEM

Division of Solem Machine Company

123 S. NIAGARA STREET

LOCKPORT. NEW YORK



You don't have to go this far to find coated abrasives that will do *your* job. Just look to Armour. We have a complete line of coated abrasives — quality products that will help you do *any* woodworking job faster and better.

This Armour line includes paper, cloth or combination rolls in either Electrocoated Garalun or Heat Treated Garnet. There are sheets of cabinet paper as well as belts, discs, and specialized forms of coated abrasives.

If you are drum sanding, finish sanding, working on panels or *any* shape or size of stock, there's an Armour coated abrasive that can help you do a better job for less money.

Your Armour representative will gladly help you select the best abrasive for *your* operation. Just write or call him today.

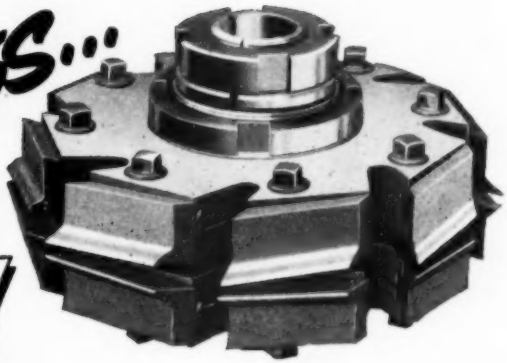
Whatever your woodworking job, Armour has just the coated abrasive you need!

Armour Coated Abrasives can help you do a better job, too!

ARMOUR *Coated Abrasives*

Armour and Company • North Benton Road • Alliance, Ohio

Balance Counts... ...and Diehl



CUTTERHEADS *ARE* BALANCED

With each knife on your cutterheads pulling hundreds of pounds in centrifugal force, it's easy to see why *balance counts.*

That's why Diehl Cutterheads have won top preference in the wood-working industry—for they *are balanced* . . . both statically and dynamically . . . on the finest dynetric balancer obtainable. And Diehl Cutterheads are built to *hold the edge and stand the wear* of high speed production.

To make sure of perfect balance and longer life, always specify Diehl Cutterheads. Contact your Diehl Representative or the factory. Ask for Condensed Cutterhead Catalog—Bulletin No. 452.

Every Diehl Cutterhead is balanced—both statically and dynamically—on this precision dynetric balancer.

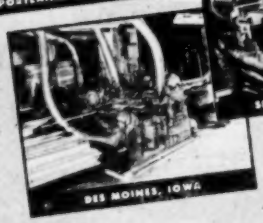
Standard of Comparison in the Woodworking Industry

On the Banks of the Wabash

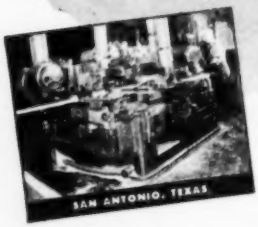
THE G. M. Diehl MACHINE WORKS, INC.

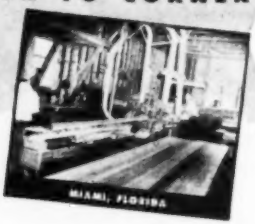
WABASH, INDIANA • U.S.A.

All Over the Map!



COAST TO COAST...
AND CORNER TO CORNER...





EKSTROM CARLSON

HI-SPEED MOULDERS

ARE *Producing* IN

WOODWORKING PLANTS

Busy shops all over the country are getting out more and better work every day with ECCo Hi-Speed Moulders. Look at the *outstanding features* of this modern machine — independently operated spindles with pre-selectable speeds — speed selection *without* use of a frequency changer — cutterheads jointed at high spindle speeds — infinitely variable feed rate from 25 to 225 feet per minute without stopping the machine — increased production — reduced knife cost — reduced head cost — and lower operating costs. This performance is backed by alert, experienced EKSTROM CARLSON SERVICE that insures maximum efficiency. If you want to see ECCo Hi-Speed Moulders in action, let us send you a list of the installations nearest you. For full specifications, description, and data on models available, write for new Bulletin M200.

ECCO

MOULDERS • SANDERS • ROUTERS • SHAPERS • CARVERS • PANEL SIZERS • GROOVERS

EKSTROM, CARLSON & CO., 1400 Railroad Ave., Rockford, Ill.

New POSITIVE-LOCKING WEBBING FASTENERS *speed assembly*

Webbing is inserted through slots and looped back over itself . . . this adaptation of the simple but effective "luggage strap" principle ensures positive grip without danger of slippage.

One end is attached by positioning clip so that drawn stud locks in hole bored in tubing. Process is repeated at other end of webbing, using simple hand tool for leverage.

Result . . .

Webbing seats and backs are tight and smooth.

Webbing is firmly anchored both ends, not weakened by screws.

Seats and backs are as easy to take apart as they are to put together.

No special skill required.

UNITED-CARR FASTENER CORP.

31 Ames Street, Cambridge 42, Mass.

MAKERS OF DOT *FASTENERS*

HANCHETT

"Talk to the men who use them"

When you talk to men who use these two great tools, you'll find unusual enthusiasm. Most often, expert saw fitters praise these Hanchett characteristics:

1. Unusual ease of adjustment
2. Natural "feel" and balance
3. Sensitive, precise action
4. Wide range of adjustment
5. Simplicity — with rugged strength

Hanchett MATCHED EQUIPMENT for the Saw Mill and Lumber industries leads the field in outstanding quality and performance. For full details, write for Bulletin WW-83

COVEL SAW SHARPENERS · HANCHETT KNIFE GRINDERS

FAMOUS RED ANCHOR GRINDING WHEELS SEGMENTS—DRESSERS CUTTERS—COMPOUND

Hanchett Manufacturing Co.

World's Largest Manufacturers of Saw Sharpening & Knife Grinding Machinery

Main Office — BIG RAPIDS, MICH.
West Coast — PORTLAND 4, ORE.

No. 10 BAND SWAGE SHAPER

•

No. 36 BAND SAW SWAGE

No. 10 Band Swage Shaper

No. 36 Long Die Band Saw Swage

Black & Decker SCREW DRIVERS

are powered for

faster work, greater accuracy, more dependability!

New No. 8 SCRUGUN*
High-powered, light, compact . . . drives up to No. 8 screws to uniform tightness automatically. Quality built for high production service. Choice of paddle or toggle switch.

Choose from 21 models of Black & Decker Screw Drivers . . . for driving and tightening everything from the smallest screws to ½" diameter nuts. They're all powered by B&D-built universal motors for fast, steady driving. They're light and well-balanced—cut operator fatigue, reduce slippage and marring. Choice of positive or adjustable clutch, 90° angle heads for close quarter work. For dependable performance on all jobs, specify Black & Decker!

See your nearby B&D distributor for demonstrations of these and other time-saving, cost-cutting tools. For free catalog, write: THE BLACK & DECKER MFG. CO., 635 Pennsylvania Ave., Towson 4, Md.

*Trade Mark Reg. U. S. Pat. Off.

DRILLS
SANDERS
BENCH GRINDERS
SAWS
GLUE POTS

LEADING DISTRIBUTORS EVERYWHERE SELL

B&D Black & Decker PORTABLE ELECTRIC TOOLS

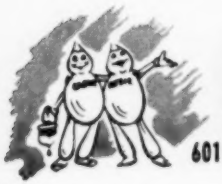
WHY

our salesmen like to deal with you men who know

GLUE

Our field representatives have a *working* knowledge of the glues they sell. They are as at home in your glue room as they are at your glue buyer's desk. If you, too, like to deal with men who know glues — write or phone the National Casein office nearest you today.

You'll Stick with us Because we Stick for You!



National Casein

601 W. 80th St., Chicago 20, Ill. • Broad and Fulton Sts., Riverton, N. J.

"Nothing touches AMF De Walt for interior trim!"

Says M. S. Morris, Shop Foreman of H. Beckstoffer's Sons, Richmond, Va.

"There's no machine that can touch AMF De Walt® when it comes to doing a first-rate job making *every wood product needed for interior trim.* AMF De Walt turns out top-quality cabinets, closets, window and door frames, and wall moulding for us.

"In constructing these wood products, we use difficult cuts like dadoing, rabbeting and mortise and tenon cutting. AMF De Walt makes these easily and accurately.

"And what's more, AMF De Walt's the best saw for cutting off, beveling and mitering we've used.

"All around, and especially for interior construction we've found AMF De Walt is tops!"

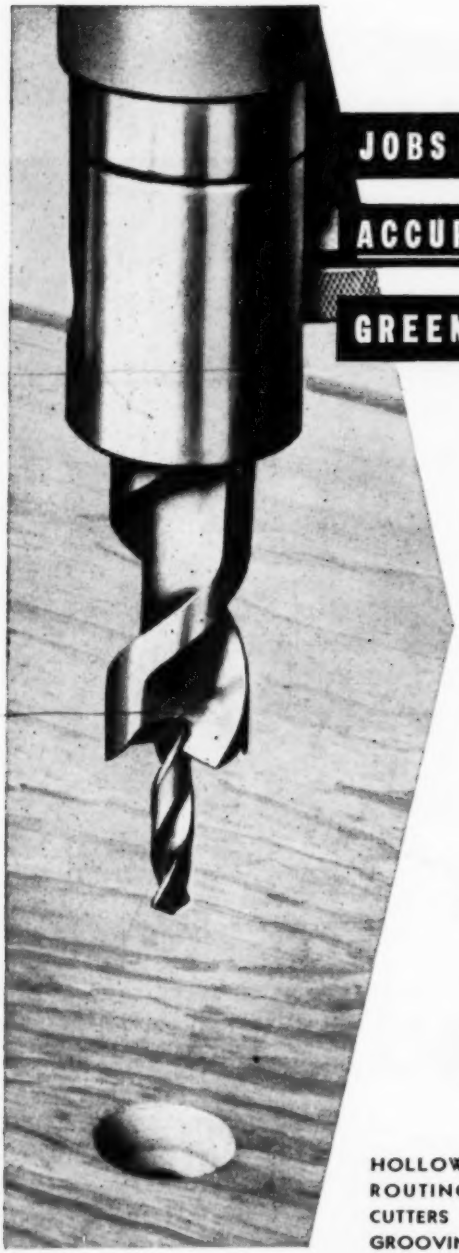
Find out about the *many* woodworking operations *one* AMF De Walt can do—quickly... accurately ...safely. See your AMF De Walt dealer or write us for full details.

AMF products ARE BETTER...*by design*

AMERICAN MACHINE & FOUNDRY COMPANY

AMF DE WALT POWER SAWS

Write AMF DE WALT, DEPT. WD-8, LANCASTER, PA.



JOBS DONE SMOOTHLY, ACCURATELY WITH GREENLEE COUNTERSINKS

Countersink precisely as you want to . . . swiftly, smoothly with GREENLEE Adjustable Countersinks which let you set the lead drill at whatever boring depth desired. Wide range of sizes . . . three types: (1) with extension-lip type counter for boring flat-bottomed holes, (2) with beveled cutting edges corresponding to the taper of flat-head screws and (3) with beveled cutting edges to countersink for screw heads below the surface of the wood. Write for facts. Greenlee Tool Co., 2138 Herbert Avenue, Rockford, Illinois.

Ask for free *Boring Chart for Wood Screws . . . simplifies tool selection*

TOOLS FOR CRAFTSMEN

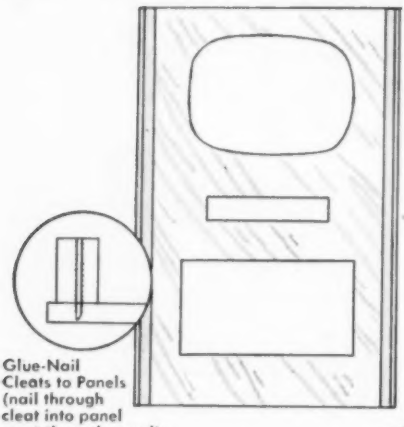
GREENLEE

HOLLOW CHISELS • MACHINE BITS • DRILLS
ROUTING BITS • MULTI-SPUR BITS • PLUG
CUTTERS • COUNTERSINKS • MAKERS OF TECO
GROOVING TOOLS FOR TIMBER CONSTRUCTION

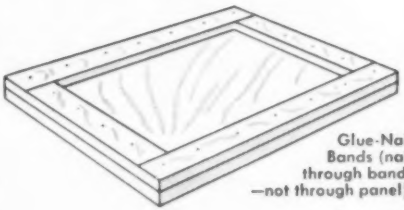
SUPREME
BAND SAWS
• SUPREME BAND SAWS cut faster...have increased cutting capacity with minimum breakage! Present day high speed equipment demands SUPREME SAWS. Free from kinks and imperfections. Made from the finest Special Nickel Alloy Steels, tempered for toughness... to stay sharp! There is a Supreme Band Saw for every industry... for every material. Special purpose saws are made to order.
BEST FOR EVERY INDUSTRY
The SAW & KNIFE SPECIALTY CO., Inc.
6526 CARNEGIE AVENUE • CLEVELAND 3, OHIO

WORK WHILE THE GLUE SETS

ELIMINATE SLOW, COSTLY CLAMPING *WITH* AUTO-NAILER*



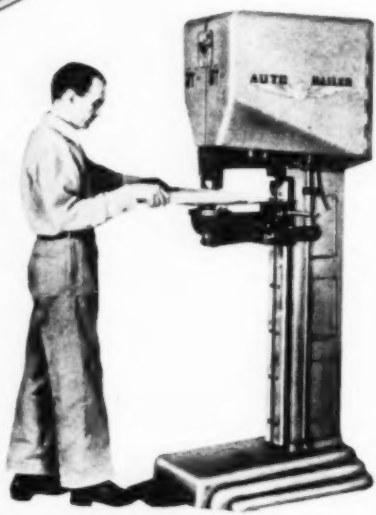
Glue-Nail Cleats to Panels (nail through cleat into panel —not through panel)



Glue-Nail Bands (nail through bands —not through panel)

Glue-Nail Bed Rail Slat Bearers (nail through Bearer—not through rail.)

A tight joint and positive glue bond are assured by using Auto-Nailer because the work is squeezed under pressure of 1,000 pounds. No slow, costly clamping. And since the auto nails sustain this pressure, the stock can be handled and worked while glue is setting.



WRITE FOR FREE CATALOG

AUTO NAILER
TRADE MARK REGISTERED

AUTO-NAILER CO.

265 MARIETTA ST., N. W. • ATLANTA GEORGIA

*Trade Mark registered

TOO MUCH for GRANTED ?

Do we take too much for granted when advertising wood products? This and many other questions on better ways of marketing were discussed outside the meeting rooms at the Forest Products Research Society convention at Memphis in June. It took a congressman from Oregon to pick out several of our weak points as well as our strong ones. Among the weaker ones was marketing.

To discover whether we are taking too much for granted, I began with (and got no further than) a study of wood product advertising in consumer magazines. The answer based on this investigation is definitely yes, we do take too much for granted!

There is a difference between the advertising used by the metal furniture people and the kind of advertising used to sell wood furniture! The metal people proudly proclaim their furniture to be METAL furniture. It almost seems that we try to keep secret the fact that ours is made of wood. Why?

I do not presume to be an advertising expert, but to me the majority of consumer ads for wood products are attractive and interesting and afford an excellent opportunity to extol the virtues of wood. This does not need to be lengthy, but such things as wood furniture, flooring, paneling and building materials could carry a short, informative paragraph describing the good points of the wood species being used.

Some of the adjectives used to describe wood in beautiful full page, four color ads, in such magazines as "Good Housekeeping," "Better Homes and Gardens" and "Ladies Home Journal" seemed to be misplaced. They included "charming birch," "luxurious oak," "companionable pine" and "dainty cabinets of wood." Paul Bunyan would be ashamed of such adjectives!

Hardest to understand was the fact that many of these fine advertisements did not even mention that the product was made of wood! The reader was to assume that the product was wood from the illustration.

It is my belief that the more often we mention wood favorably in our advertising and elsewhere, the less likelihood there is for substitutes to take the place of wood. If we in the woodworking industry cannot speak favorably and constantly about wood, how can we hope to offset the constant, and very often inaccurate, claims of wood substitutes?

Let's, in all of our advertising, tell about the many wonderful properties of wood, and remember not to take too much for granted when we market wood products!

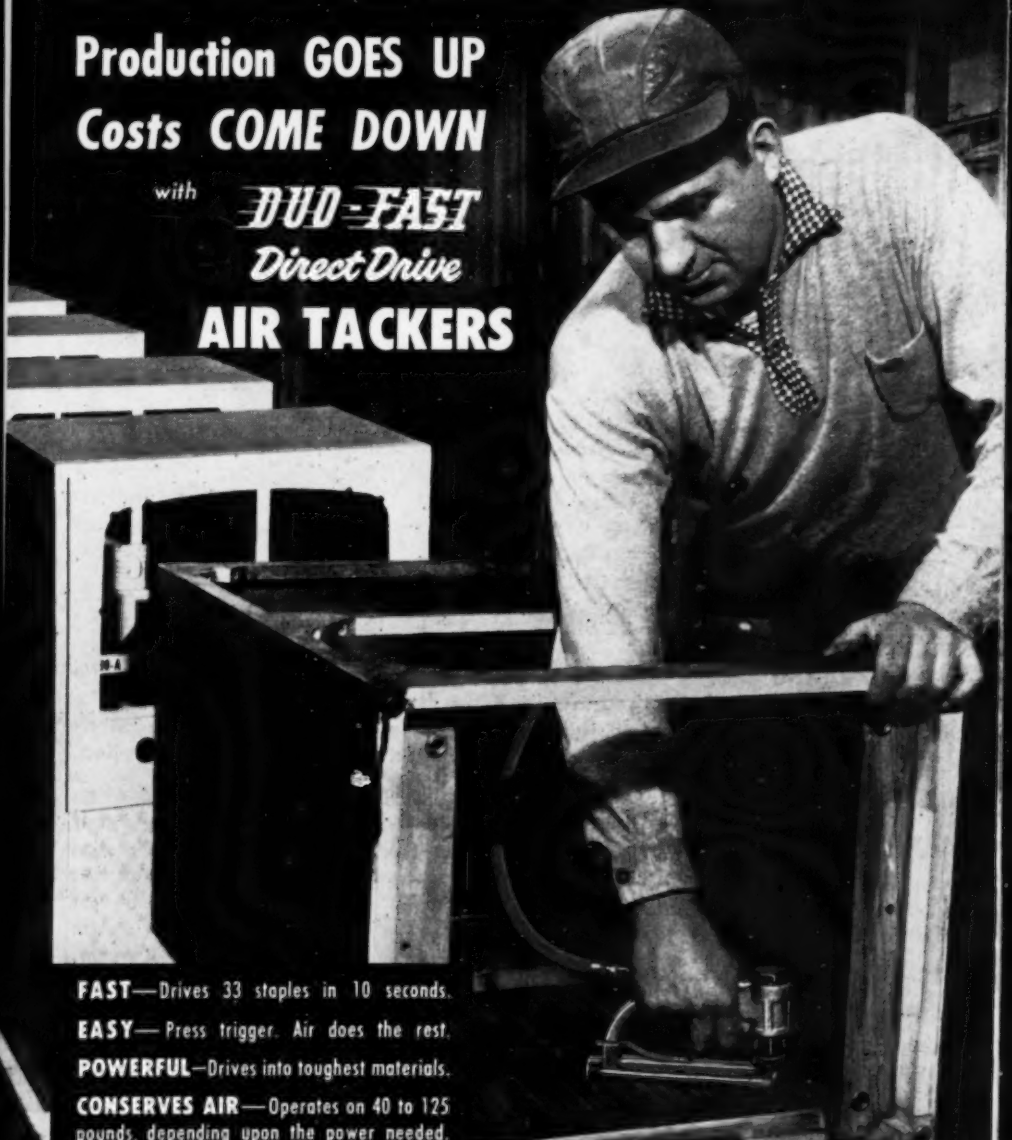
Ned Bailey
Editor-in-Chief

ACTUAL PHOTO IN IGLOO CABINET CO., A LEADING TV CABINET MAKER

Production GOES UP
Costs COME DOWN

with **DUO-FAST** *Direct Drive*

AIR TACKERS



FAST—Drives 33 staples in 10 seconds.

EASY—Press trigger. Air does the rest.

POWERFUL—Drives into toughest materials.

CONSERVES AIR—Operates on 40 to 125 pounds, depending upon the power needed.

LIGHT—2 pounds. Ideal for women workers.

3-SEC. LOADING—Saves operators time.

12 MODELS—Wide Range of Staple Sizes.

Send for the timesaving, moneysaving facts on Duo-Fast Direct-Drive Air Tackers.

FASTENER CORPORATION 860 FLETCHER ST. CHICAGO 14, ILL.

☐ Please send information on Duo-Fast Air Tackers.

☐ Also interested in Duo-Fast Manually Operated Tackers

Name of Firm_____

Your Name_____ Title_____

Address_____

Construction of a $3 million wood products laboratory building is scheduled to start this year at the State University of New York College of Forestry at Syracuse, N. Y. Wood utilization and timber physics laboratories in the new building will contain all types of woodworking equipment. Facilities will include an electronics laboratory for study of radio frequency gluing techniques, timber breakdown and preparation unit, and laboratories for studies of wood preservation, veneers, plywood, gluing, finishing and lumber drying.

Ebasco Services, Inc., New York City, has completed a year-long study of the forests in the upper peninsula of Michigan. Those wood-using industries likely to remain in a healthy financial condition for years to come include: the production of veneer logs, dimension stock, hemlock lumber and pulpwood.

The army's transportation corps estimates that it will save $250,000 by using tongue-and-groove wood sides instead of steel plates for an undisclosed number of 40-ton high sided gondola freight cars to be ordered soon for overseas use. The corps also recognizes that it is cheaper and easier to keep the wooden cars in repair.

Cautious, careful buying and hard shopping characterized June markets. Volume varied with individual companies. However, authorities forecast that "it will be a good, healthy fall for all furniture business."

Incidentally, first sets of color TV are scheduled for next spring. They will sell from $800 to $1000.

As we go to press, word comes that Erle J. Smith, president of the H. B. Smith Machine Co., Smithville, N.J., passed away July 15.

"Prefabs" take a lot of lumber . . . each ready made house averages 4,890 bd. ft., according to a recent survey by National Lumber Manufacturers Association. In addition, each prefabricated dwelling uses an average 2,776

sq. ft. of wallboard. As long ago as 1950, total annual consumption by the prefab industry amounted to 250 million ft. of lumber . . . 141.5 million sq. ft. of plywood . . . nearly 16 million bd. ft. of wood siding.

We anticipate that this month's article on "Wood Vs. Aluminum" will cause some comment. Here — wooden awnings — is a market we can hold with facts and figures as shown in Mr. Reno's article. The Electronic Glue Line and Relocatable Housing are other features this month.

They are making a new industrial building material at Newark, Ohio, called Tectum. Made from wood fibers and chemical, the product does not rot, weaken with age, support combustion or appeal to the termites. Tectum Corp. says that the fibers can come from wood not usable under ordinary conditions.

Wood played an important part in measuring ship speed. Originally it was measured with the log, a specially shaped piece of wood, at the end of a long line which was thrown overboard from the stern. At regular intervals on the line knots were tied and the number of knots paid out in a fixed time, usually 28 seconds, were counted. More modern logs measure the speed of the water going past the ship by means of a small propeller.

Building activity in the U.S. during 1950-52 was higher than at any other time in the history of the country, according to a chart just published by Dun & Bradstreet from figures compiled by the U. S. Department of Commerce.

Any of our readers may have reprints of our recent editorials — June, July and August — which are part of a series showing weaknesses in our industry and steps we should take to correct them.

Plastics threaten wood veneer in the field of radio-TV cabinet, furniture and wall panel markets. We can overcome this with the facts which show wood's superiority. However, at present it is a real threat since these plastic "veneer" sheets seem so authentic that they can fool an expert at a distance of 10 feet. A group of New York wood importers and veneer makers and distributors have organized the "Committee to Further the Uses of Fine Cabinet Woods."

The committee is seeking to educate the public as to the difference between "photo finish" and genuine wood veneers. Also it's starting a campaign to obtain correct labeling of the "photo finishes" as such.

The Timber Engineering Co. has been reviewing all specifications involving wood used for government contracts. This enables manufacturers to meet government requirements more readily. Manufacturers have been hesitant in bidding on or accepting some of the government contracts because of difficulties in obtaining sufficient amounts of lumber in the grades and species required by Federal specifications.

A conservatively estimated 100 million board feet of lumber is required annually for military purchases of items made of wood.

24 Chipboard Plants are NOW proving Siempelkamp Efficiency!

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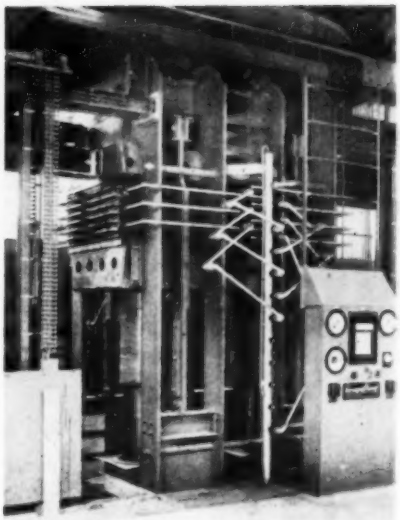

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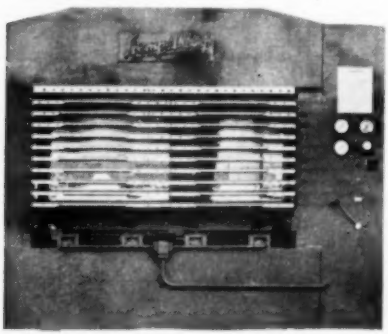
This typical chipboard press, 4' x 8', is supplied with 6 openings, with accommodations to add another 4 openings. Other Siempelkamp equipment includes: plywood presses, veneering presses, hardboard presses, veneer dryers and softboard dryers.



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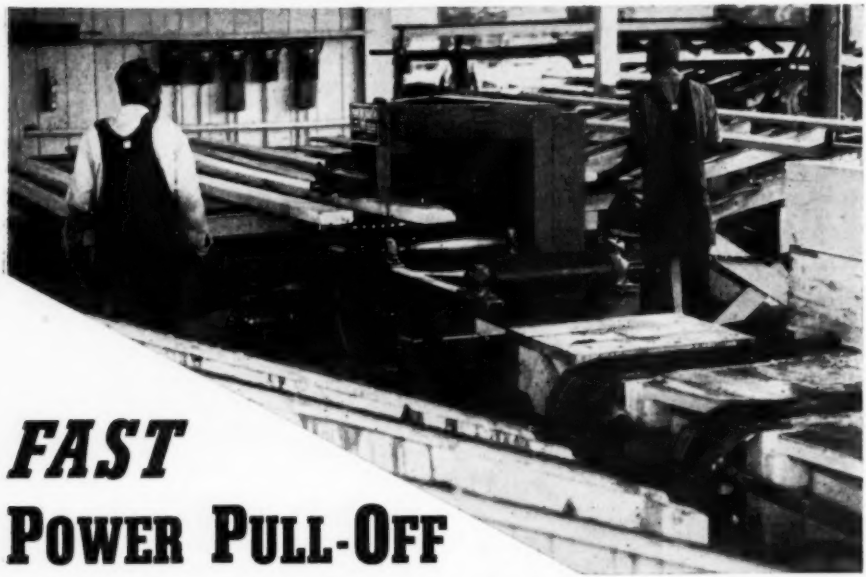

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Comments from THE NATION'S CAPITAL

By Arnold Kruckman
Washington Correspondent

C. D. Hudson, outstanding in anything that has to do with wooden boxes and shooks in Washington, was one of the most notable trade representatives who appeared in June before the hearings of the Intergovernmental Relations Subcommittee of the House Committee on Government Operations. This is the sub-committee that is headed by Mrs. Cecil M. Harden, representative from Indiana.

The Intergovernmental Relations Subcommittee has launched particularly on an investigation of the business, finance and industrial operations of the many agencies of the Federal Government, which compete with private enterprise. The hearings brought out literally dozens of commercial activities in which the Federal Government is engaged. It was discovered that the great majority had come into existence without authority, except such as the agencies themselves devised, and that funds to pay operating expenses and to purchase materials and machinery and to pay for labor, had simply been taken out of appropriations which were so vaguely marked that the use of the money could be excused if not entirely justified.

Mrs. Harden's subcommittee is guided in its work by Ray Ward. Mr. Ward is the director of the investigation, and has an office at 224A Old House Office Building. Incidentally, he will be glad to hear from anyone in the woodworking industry who has any information of value to what he is doing. Such information, if desired, is treated as confidential. The committee is about to issue a general over-all summary of its findings, and thereafter will issue separate reports on each group of industries and services whose representatives appeared at the hearings.

Mr. Hudson's testimony revealed, probably, the most startling situation. It was shown that every branch of the armed services, as well as other agencies connected with defense, dur-

ing the past 10 or 12 years, have built up a nailed box industry that essentially is more than an equal competitor with the private nailed wooden box industry.

It came out that where units of the National Wooden Box Association employed two or three nailing machines, those who made wooden boxes in the armed services installations used as many as a dozen such machines. It also was revealed that few of the government wooden box-making units could supply clear and precise cost figures. There was no doubt that government people spent much more on making a box than did private industry.

It was discovered that the navy box factory at Norfolk had actually driven a private manufacturer out of business. In other instances it was found that business of box manufacturers had been seriously reduced by the government competition. It was found the army, navy, air force, marine corps and many of their subdivisions were engaged in making nailed wooden boxes. Such box-making installations were reported at the army's general depot at Atlanta; at the Granite City, Illinois, engineering depot; at the Memphis general depot; at the Utah general depot in Ogden; at the Belle Mead general depot at Somerville, N.J., and at the ordnance depot at Chambersburg, Penna.

In one instance the army bought millions of feet of the very best lumber to make the boxes. It has procured a large inventory of nailing machines; and similar purchases have been made by the navy, air force and the marine corps. The corps of engineers, the ordnance department, and, of course, outstandingly the quartermaster corps, have acquired inventories of machines and lumber.

Some of the necessary services are supplied by uniformed personnel, so far as such services are consistent with the normal activities at bases, of enlisted and commissioned individuals. But the actual work is done by civilian laborers. This, in part, explains why the armed services have had a payroll of such an enormous number of civilian help. The whole incident is surrounded with such extraordinary figures of volume, dimensions, operating space, working force, handling, warehousing and money value, that it is unwise to use actual figures until the Intergovernmental Relations Subcommittee reports are published.

Subsequently Mr. Hudson reported to his industry, "Plans for shutting down an appreciable percentage of government-owned box-making facilities, and diverting this volume of requirements to commercially operated box plants, are reported to have progressed within the Department of Defense to the point where specific instructions and directives are being drafted, applicable to the various installations. If consummated as now planned, the new policy will become effective by the end of this year."

The recent hearings of Mrs. Harden's committee has had astonishing results. It has prompted those agencies, whose

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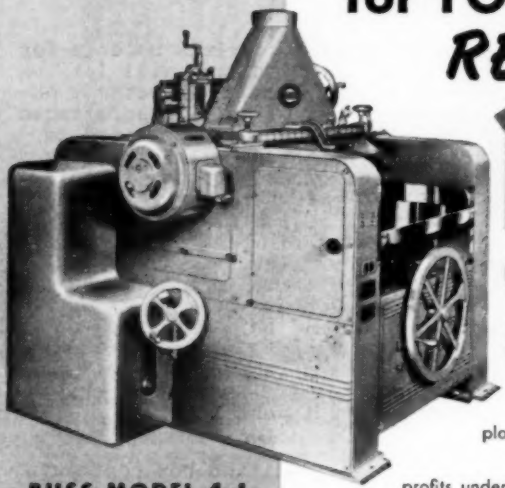

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operations in trespassing on private enterprise were revealed by the trade representatives, to hastily retreat from what they were doing. Practically all of them are now engaged in covering up because, in essence, they cannot justify the extraordinary use of the taxpayers' money to compete with the taxpayer in business. The operations, on the whole, literally were illegal, according to Director Ray Ward. In this category come a number of agencies which engaged in the manufacture of furniture and other products of the woodworking industries.

The fear of those, who made the recent hearings notable for their exposures, is that people in private industry will let down,and not follow through. Much of the present effect was obtained by the appeals of the business people who were astonished by the extent of government competition, and who complained to their senators and representatives in Congress. They, sensing the real urgency behind the appeals, vigorously protested to the heads of the agencies involved, and investigated the legality of the operations. Congressman Frederic R. Coudert, Jr., (R.,N.Y.), early in the session, introduced H.R. 15, which would establish a special committee to hold hearings on the competition of government with private business in various parts of the country. Director Ward and trade representatives such as Mr. Hudson, feel this proposed committee should be authorized as quickly as possible. Its activities will unveil more needed information, and will make the people of the country generally aware of what has been happening, and how the taxes they pay into the treasury have been used with very thin legality.

Mr. Hudson reports mills handling ammunition box contracts are producing a total volume greater than at any time since the peak of World War II. He says plants producing containers for general industrial uses are operating on an average basis in excess of 45 hours per week and currently are exceeding the 1952 level. Many such plants have no direct government contracts, but it is safe to assume that more than 50% of this volume is designed for the shipment of military items.

Reorganization Plan No. 2, which became effective June 4, gave Agriculture Secretary Benson the authority to consolidate 16 Agencies in the Department, including Forest Service. In Interior two members of the forestry staff of the former Division of Land Utilization, John F. Shanklin and William Endersby were switched to a new technical review staff. Howard C. Sullivan, head architect of the navy's Bureau of Yards and Docks, retired after 40 years' service.

Walter M. Zillgitt, U. S. Forest Service in Washington, D.C., has been transferred for forest management research work at Missoula, Mont. Robert E. Wolf recently came from forestry work in Arkansas to the Division of Natural Resources, including Forest Service, in the Bureau of the Budget in Washington, D.C. Floyd W. Godden, former assistant regional forester in Utah, is now assistant chief of the U.S. Forest Service Division of Cooperative Forest Protection, with headquarters in Washington,

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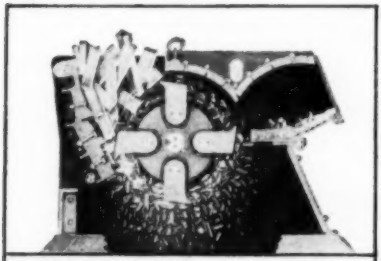

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D.C. Mason B. Bruce, U.S. Forest Service Timber Management Division, in Washington, D.C., has become supervisor of the Olympic National Forest in the State of Washington.

Senator Homer E. Capehart reports that a Massachusetts business man has written him and that Administrator Cravens told the Massachusetts business man, "We are making no loans to small business as such; nor to defense plants unless they are making an article that cannot be procured otherwise, – unless under very exceptional circumstances."

The business man reported that Cravens said it might be a good thing if some struggling small businesses were eliminated; that it might make it better for the "more efficient." He said he was not interested in making loans to weak sisters or distressed unemployment areas; that some shake-out might be desirable, even if it meant suffering to some. Senator Capehart assumed this might mean it would be the policy of the Administration to encourage consolidation of the small units with the large.

The Smaller Defense Plants Administration, which has been helpful to small business, is scheduled to go out of existence the end of July. The Small Business Administration, which has been hanging fire in the Senate, apparently will be established by the Act of Congress as a permanent independent unit, against the judgment of the President. It is to have the power of insuring loans to small business in sums up to $250,000. There is some question as to whether it will come in existence, because the Department of Commerce wishes to make the agency a part of its subordinate elements.

August 17-21, Timber Engineering Co., affiliate of the NLMA, will have a seminar in wood adhesives, gluing and laminating, in the research laboratory in Washington. The course is designed especially for plant operators and glue room personnel in the furniture, woodworking, boat building and structural timber laminating industries. It will be the third course at the Teco Laboratory this year, and the 18th since 1949. Enrollment is limited to the first 15 applicants.

NLMA officers and directors recently visited Washington to ask top administration officials to halt land-grabbing by the Federal Government. They met with Vice-President Nixon, Interior Secretary Douglas McKay, Commerce Secretary Sinclair Weeks and Assistant Agriculture Secretary J. Earl Coke; also Interior Undersecretary Ralph A. Tudor; Commerce Undersecretary Robert Murray, Jr., and Assistant Commerce Secretaries Samuel W. Anderson and Craig Shaeffer. This committee also vigorously complained about the manufacturing activities of the armed services and demanded that the Federal Government halt military sawmill operations which compete with private industry. The lumbermen urged that the Forest Products Division of NPA be relocated in the Commerce Department; and that representatives of the lumber and allied industries rotate as directors of the division. They protested Japanese proposals to establish forest products manufacturing plants in Alaska.

Mike Mazurki, well-known wrestler and actor, now appearing in *Guys and Dolls*

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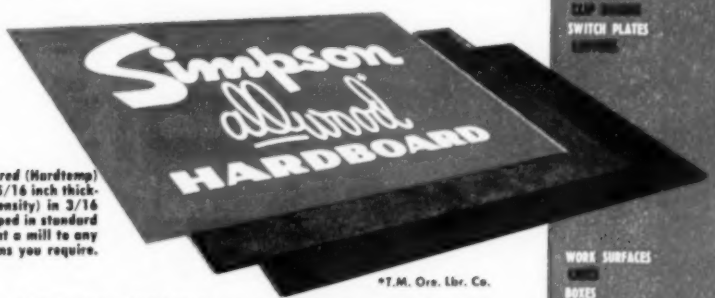

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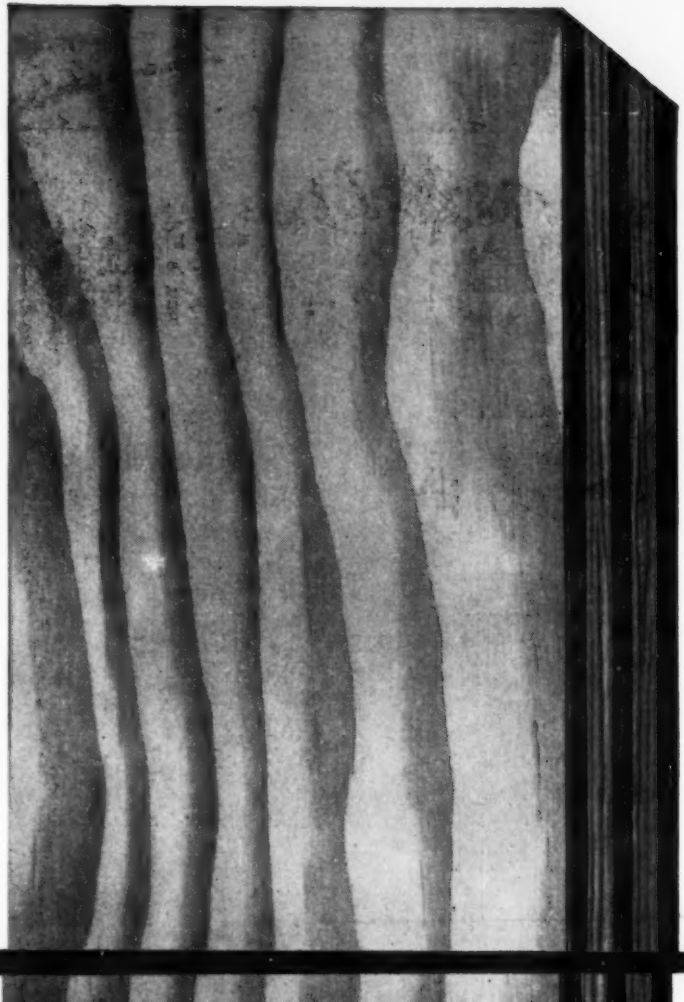

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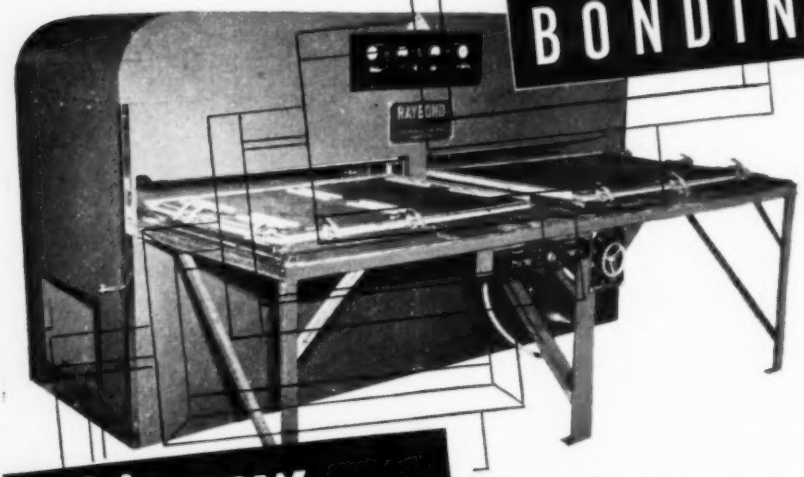

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THE ELECTRONIC GLUE LINE

By Paul H. Graham

BASIC gluing characteristics and cost should not be the only considerations in the selection of an adhesive for use in electronic gluing applications. Since the electronic glue line provides the main power consuming load on the electronic generator, the primary consideration should be its electrical characteristics. Conductivity of resin glues commonly used in electronic gluing varies with individual formulation as well as type of adhesive, and few wood species have the same electrical resistance. All show a variance with differences in density and electrical resistance seems always to be greater across the grain than parallel to it.

Because the application of electronic heat to the resin glue line creates chemical changes in the glue film to set it up into a permanent bond for welding the wood components together, a good understanding of the chemistry of synthetic resin adhesives as well as the physical problems of adhesion are required. The type of adhesive and the formulation best suited for individual application are best determined by the adhesive manufacturer's representative who has had opportunity to observe and participate in many similar installations—from preliminary experimentation the final production application.

Most resin glues used in electronic gluing applications are cold-setting (room temperature) or intermediate-temperature setting urea, resorcinol and phenol-resorcinol glues with relatively high solids content developed for cold press gluing. Some hot-press melamine glues have also been developed for electronic gluing which although somewhat more expensive than other types, produce excellent results. Practically any of these adhesives in proper formulation contain the right combination of conductivity, arc resistance, and quick setting or curing properties.

A general description of the sequence of reactions which must occur in the glue line, after the glue has been spread, would include: 1) flow into a continuous film; 2) transfer from spread to unspread surfaces; 3) wet wood substance at both surfaces; 4) penetration of both surfaces; 5) solidification under electronic (dielectric) heat which will set up an infusible bond.

Various theories have been advanced regarding what does actually happen when electronic heat is applied to a moist glue line. One of the more plausible and interesting is that contained in the findings of exhaustive laboratory tests conducted at Louisville, Ky, by the Thermex Division of the Girdler Corporation, which states in part:

"Observations have shown that the glue formulation reaches its boiling point within two or three seconds, followed by a period of four to seven seconds at a constant temperature of about 230° F. while the moisture is boiling off. The balance of the cycle represents the curing cycle of the resin and varies from 2 to 25 seconds depending upon

the character of the adhesive. It is significant that during this curing cycle the temperature in the glue line falls rather than increases."

Those adhesive elements which most affect adaptability and efficiency of any electronic gluing application are: penetration, wetting, heat sensitivity, flow, liquid life, viscosity, solids content, solvent balance, conductivity and heating temperature. There seems to be considerable difference of opinion regarding the relative importance of penetration; some authorities contending that penetration is only incidental and does not contribute materially to bond strength, but that wetting of the wood surface is the primary factor in producing a good electronic glue line.

An opinion stated by R. W. Peterson, of the Forest Products Laboratory at Ottawa, Canada, has this to say about penetration: "Most of the heat in electronic wood gluing is concentrated in the glue line because volume of the glue is always much less than the wood. Thus, electronic power disssipated as heat will always be greater in the glue line than in the wood being bonded even though primary electrical resistance of glue lines and wood is approximately the same. Moisture imparted to the wood will change electrical characteristics of the wood portion immediately adjacent to the glue line, so degree of penetration of glue into wood is an important factor."

It must be admitted that penetration influences all factors to some extent and is itself influenced by various conditions in the application of glue to mating surfaces of wood. Wetting is partly a glue property controlled in formulation, partly an operating chemical variable, and partly a surface property of wood components. It has been aptly described by Alan A. Marra in an adhesive study conducted for the furniture industry as: ". . . involving the chemical attraction of wood for the adhesive molecule and is thought to be the basis for adhesion itself."

Heat sensitivity requirements vary according to the individual electronic heating application, i.e., perpendicular, parallel or stray field heating. Since there is a natural tendency for the heating effect to be concentrated in the glue lines, practically any heat-sensitive glue may be used in perpendicular heating. Most operators seem to find glues of the cold-setting type more practical from a production standpoint. Cold-setting glues are also generally preferred for parallel and stray field heating applications. High solids content glues usually permit the use of higher bonding temperatures as they contain less volatile material. A high loss factor is also an advantage if the glue contains sufficient moisture to west the wood enough to create a mechanical bond.

Flow is possible only when actual contact of mating wood surfaces is made while the glue is fluid. This is required to provide proper penetration into the unspread surface. Flow has been described as the behavior of liquid glue as it fuses over and around the wood fibers and becomes fixed on them to provide the proper grip. This action requires the allowance of sufficient time which is controlled to a great extent by liquid life, glue composition, rate of heating, moisture content of the wood at the bonding surface and pressure application. If any of these factors are out of balance, excessive flow or too rapid cure can be produced to affect the quality of the bond at the glue line. Some adhesive manufacturers recommend the use of a safety factor of about 20% over the calculated minimum time requirement for proper control of flow.

Liquid life has a direct effect upon curing speed; as it decreases the curing time is shortened. As any resin glue

ages, its liquid life, or pot life as it is sometimes called, is cut down. This may occur in storage, in the pot, or in the glue spread. It is prolonged deliberately by reducing the temperature in cold storage, or by the use of water-jacketed reservoirs at the glue spreader. Too short a liquid life, however, can cause trouble. When the glue approaches the end of its liquid life in some adhesive types, it may cause the electronic generator to overload and impair the resultant glue bond by reason of inefficient selective heating.

Viscosity of the glue mix must be controlled to meet electronic gluing conditions. Proper control of viscosity will shorten the heating cycles required and produce a superior bond. Most operators prefer to use a thicker mix for electronic gluing than they use for either cold or hot pressing even though this practice is a bit more costly. The chief reason advanced for this practice is that it decreases the amount of arcing caused by squeeze-out on the edges. One operator claimed that there was less tendency for the glue to froth upon boiling. Temperature has an important effect upon viscosity. For example, when mixed or held at temperatures below 70° F., a resin glue mix will usually develop a viscosity rate slow enough to impede proper wetting action on the wood, without which a good bond cannot be obtained.

Solvent evaporation directly affects the quality of the electronic glue line and proper control requires that a correct balance be determined between moisture content of the wood, solvent evaporation and heating temperature effects. If the solvent is permitted to evaporate to permit proper glue viscosity, the application of pressure helps wetting by the glue and produces a good quality bond. Too rapid evaporation can cause ultimate bond failure or a partial pre-cure which will not permit drawing enough electronic power to complete the cure of the glue line. If solvent evaporation is too slow, steam pressure may be set up in the glue line. Electrical characteristics of the glue line may also be affected to the detriment of a good bond. It is very important that there be a proper balance between the quantity of solvent in the glue and opportunity for enough of this solvent to evaporate to provide a sufficient resin content in the glue line and to create favorable electrical characteristics needed for a good cure with required heat selectivity.

Conductivity requirements of the electronic glue line will also vary with the heating method employed. As previously stated, most of the heat generated electronically will be concentrated in the glue line because the volume of the glue lines is always less than that of the wood. This holds true even where the primary electrical resistance of the wood and glue lines is approximately the same. Selectivity of glue line heating is increased by formulating the glue to make it as conductive as possible, just short of arcing and/or excessive drying. This is generally accomplished by the use of a catalyst containing a conducting agent, usually sodium chloride (table salt).

Although the addition of more of this type of catalyst will make the glue heat faster in most applications, the maximum amount of additive is determined by tendency to arc. Arcing is actually a short circuit in the electronic field, or a break-down in voltage, and acts to take up most of the electronic power, so that other portions of the glue line are neither uniformly nor adequately heated sufficiently to form a good bond. Too low conductivity, on the other hand, will reduce selective heating. Proper formulation for conductivity is bounded on the high side by voltage gradient, and on the low side by preferential heating and short pot or liquid life. Ad-

justments are usually made on the job, fixing correct proportions by adding catalyst until arcing occurs and then reducing the amount of catalyst until liquid life is too short.

In perpendicular heating, as used in bonding plywood or laminations, electronic heating takes place mainly in the wood and use of a glue formulated with less conductivity generally increases selective heating of the glue lines. Parallel heating, as used in edge gluing panels, requires a glue with sufficient conductivity to draw electronic power well but not conductive enough to cause arcing. Stray field heating, as used in panel-to-frame gluing and assembly gluing, also requires a highly conductive glue which may use additional power. However, this provides a more equal distribution of heat.

The current trend is to modify resin glues for electronic gluing to increase the chemical reactivity of its basic polymeric constituents at high glue line temperatures, in the neighborhood of 240° F., as well as to provide the required increase in conductivity. Thus, when electronic power is applied the temperature rise is practically immediate, evaporation is much faster than with conventional methods of gluing, and a partial cure is effected to secure the grip required to hold assembled parts together for curing at room temperature, or a relatively fast full cure of the glue line is effected.

Modern electronic gluing practice regards the ability of a resin glue formulation to transmit the electronic field as more important than its curing speed as measured by normal heating. The temperature of the glue line is gradually raised as long as the power remains on and it is required to know the setting and/or curing temperature that should be reached during the heating cycle.

Although not a common problem and not pertinent to all types of glue, it is sometimes desirable in assembly gluing not to raise the temperature too rapidly when gap filling is desired. By effecting a very gradual rise in temperature at the joint, the glue is permitted to pass from a liquid state to a rubbery condition. This prevents it from boiling out of the joint. When the glue has been set to the rubbery condition, full power may be supplied to the electrodes to complete the cure. Synthetic resin glues normally have fewer gap-filling properties than some other adhesives.

While treating with special conditions, it might be well to mention temperature gradients common to curved and molded plywood gluing. Losses of heat by convection and conduction cause the moisture and heat gradient of the wood to be much higher in the center on the surface. The area of the highest temperature is usually slightly away from the inner curve where the field intensity is greatest. Insulated electrodes or heat replacement is the usual remedy for temperature differentials which have been measured as high as 120° F. in a 2" panel. Electrodes insulated between the platens of the press will usually modify the temperature gradient to cause low temperatures to develop only in the insulating material. Heated electrodes limit the low end of temperature gradients to a pre-determined level. Convection losses are also substantially reduced in some installations by the application of infrared light rays along the path of the electrodes.

The application of a similar principle is sometimes used in assembly gluing where a number of joints of various cross-section thicknesses are to be glued together in a form. Non-uniform heat causes some joints to be under-cured while other joints begin to burn or char. An insert is provided for each

joint in the form of a good dielectric insulating material to provide an air gap between the hot electrode and the joint. The thickness of the insulating material will vary inversely with the size of the joint, the joint of the least thickness in the assembly receiving the greatest thickness of insulation.

The old theory that twice as many glue lines, as in an edge glued panel, will take twice as long to cure has been somewhat exploded. Some additional power is required as the number of glue lines is increased, but it has been demonstrated that as the number of glue lines are increased, more efficient use is made of electronic power.

As expressed by one of the electronic equipment engineers: "In edge gluing as the glue lines per inch of width increase, the square inches of glue line cured per kilowatt per minute increases, because less wood area is exposed per unit length of glue line."

There does appear to be a limit to depth of glue line in a panel, however, which is set for most conventional electronic gluing equipment installations at about 3 ". This can be increased to 6", it is claimed, by the use of "balanced output" or the use of two "hot lines," one on each side of the assembly, instead of the conventional hot and ground electrode arrangement. None of these "hot line" applications was observed in operation and such use is said to be very limited because of some technical difficulties.

Most authorities seem to agree that a moisture content range of 6% to 8% is best suited for electronic gluing although some go to 10% on the high side for solid wood. Veneers are usually held to the low side and may go down to 4%. The primary reason for use of as low moisture content as is practical is to provide better dimensional stability and to prevent warping. The use of solid electrodes permits lower minimum moisture content, but higher moisture content is required for staggered electrodes and electrodes used for stray field assembly gluing, due to the tendency of moisture to migrate from unpolymerized areas.

In general application, the lower moisture content range is preferred when the glue is highly conductive since the dry wood tends to absorb some of the water from the glue, about 1%, to reduce the amount of squeeze-out and tendency to arc. A longer heating period is required during the curing cycle and if the wood is too dry, the glue may strike into the wood to impair the bond. When moisture content is too high, steam and water often condense on the electrode to form wet areas on the wood which tend to overheat. The time factor is increased by the increase in conductivity of the wetter wood and there is definite possibility of arcing and there is likely to be uneven heating.

According to the Forest Products Laboratory's "Wood Handbook":

"The electric resistance of wood varies greatly with change in moisture content, especially below the fiber saturation point, decreasing as the moisture content increases. It also varies slightly with species, is greater across the grain than along it, and approximately doubles for each 22.5° drop in temperature."

At a wood temperature of about 80° F., with measurements taken at a depth of 5/16", approximate electrical resistance of various wood species with a m.c. of 8% is shown in the table.

While wood components are usually kiln dried to a uniform moisture content within recommended moisture content range for electronic gluing, it is well to check them for moisture content before gluing and to select mating components within a uniform moisture con-

Wood Species	Megohms
Southern cypress	3,980
Douglas fir	4,780
California red fir	6,760
White fir	15,850
Western hemlock	5,620
Western larch	11,200
Longleaf pine	8,700
Northern white pine	5,620
Ponderosa pine	8,910
Shortleaf pine	11,750
Sugar pine	5,250
Redwood	4,680
Sitka spruce	5,890

Wood Species	Megohms
Commercial white ash	2,190
Basswood	1,740
Birch	19,950
American elm	2,000
Black gum	12,600
Red gum	6,460
Hickory	31,600
Magnolia	12,600
Mahogany	6,760
Sugar maple	13,800
Commercial red oak	4,790
Commercial white oak	3,550
Yellow poplar	8,320
Black walnut	9,770

tent range. A portable moisture meter is an efficient instrument for this purpose. Variation of moisture in these wood components can cause variation in heating and variations in heating will cause variation in the degree of cure of the electronic glue line.

The temperature of wood has a direct effect upon the heating cycle. The higher the temperature of the wood to be glued the lower is the glue line temperature rise required, with a resulting shorter electronic heating cycle requirement. In many production gluing operations, work to be glued is preheated just before the glue is spread by storage in a warm area, or by conveyor travel through a heated tunnel to the spreader. This heating should not be done after spreading as there is danger of a pre-cure of the glue spread. For most applications the wood is heated to a temperature of 70° to 80° F.

Glue spread is more important for electronic gluing than for conventional gluing methods. Regardless of the heating method employed, the glue spread should be controlled so there will be full coverage of the area to be spread and a uniform transfer to the mating area, under pressure, and with a minimum amount of squeeze-out. If any bare wood area is left, an undesirable high resistance current path is set up in series to impair proper heating, and may create a tendency to arc from the high voltage gradient present in the unspread portion of the glue line.

An experienced operator advises that a light spread of thick glue sets up faster than a heavy spread of thin glue. If the glue spread is uniform in application but too thin, glue penetrates the wood to rob the glue line and set up glue deficiency which can result in starved joints and sets up resistance to the glue current path between the electrodes to cut down the heat flow to a point where it will not set or cure properly. Non-uniform or variable thickness of the glue line usually results in low temperature rise at its thickest point and excessive rise at the thinnest point.

A few operators try to compensate for improperly prepared wood surfaces through the use of a double glue spread, but a heavy glue spread usually does more harm than good. Despite some claims that glues developed for electronic gluing have sufficient body or cohesive strength to eliminate the necessity for careful joint preparation. Electronic gluing is probably more sensitive to improper stock preparation and other gluing conditions than any other gluing method generally used.

In consideration of the proper method for preparing stock for electronic edge gluing there is an argument of long standing regarding the relative merits of sawn joints versus knife-cut or jointed edges. Investigation of a number of operations using both methods of stock preparation seemed to indicate that either type of joint, properly prepared, produced satisfactory joints for most purposes. The edges, however,

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must be smooth to permit the use of even pressure, less glue, and to eliminate stresses in the bonded assembly. The edges should be flat and square with each other, or unfavorable conditions will result. These may include excessive heating cycles, uneven heating and even arcing.

The unfavorable publicity given to sawn joints has been due chiefly to improperly prepared joints in which the wood fibers were pressed down instead of cut off. The subsequent joints, in which the moisture from the glue raised the pressed-down wood fibers, has actually been a weak fiber joint instead of a solid wood joint. Failures have been numerous with this type of joint. Unless the saw blade is kept keen and cutting conditions are favorable, the rupture of wood fibers is more severe in the sawn joint than in the knife-cut joint. As a result, when this type of surface becomes a joint component, it has a tendency to pull away from the solid wood body to produce a poor bond.

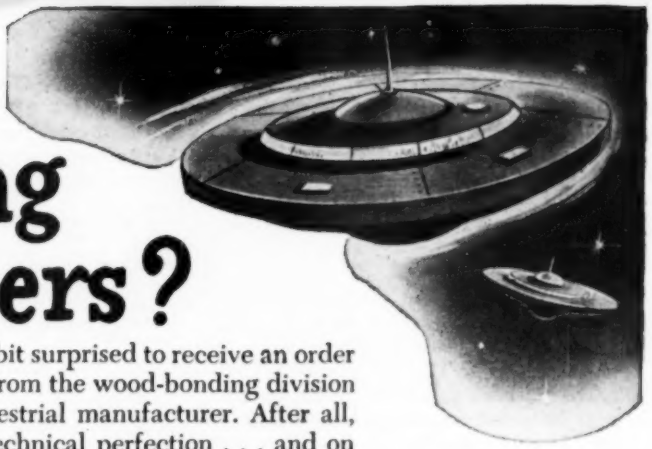
Wood components should also be stress-free at the time of gluing, as case-hardened stock in a glued-up assembly will cause warping just as in any other gluing method. This is true despite the argument presented by one operator that the immediate drying of excess glue line water by electronic heat removes most of the warping hazard.

Grain direction is also an important consideration. Wherever possible the grain should lay parallel to the glue line or never at too great an angle to it, as too acute grain angle can result in a starved joint. The exposed wood surface or area adjacent to the glue line should be relatively free from knots, large wormholes, low spots or any other irregularities which might cause pockets of glue to collect. These pockets tend to overheat and form steam blisters with any type of glue. With highly conductive glues, there is also a decided tendency to arc. Some knots have dielectric properties which can cause arcing and burning, and all knots have very short grain.

While non-uniform thickness stock with differences as much as 1/4" have been bonded electronically by reducing the voltage and increasing the heating period, better results are obtained with uniform thickness components. Substantial thickness variations can cause air gaps between the glue lines and electrodes to result in preferential heating and in which voltage can build up to cause arcing. Pressure problems are also introduced in edge gluing as down pressure is exerted only upon thicker members and prevents application of uniform side pressure.

Lack of adequate pressure in electronic edge gluing probably contributes more to poor joints than any other single factor. While excessive pressure should be avoided, sufficient down pressure should be used to properly flatten and align panel components in relation to each other, in the range of 5 to 10 p.s.i. Sufficient edge pressure is required to bring adjacent edges into intimate face contact with each other, in a range of 200 to 300 p.s.i. according to density of wood and type of joint. Most edge gluing joint failures may be traced directly to improperly prepared gluing surfaces or insufficient pressure.

Wood absorbs various amounts of electronic power in all electronic gluing methods and different wood densities cause variations in power distribution. The denser the wood, the more power it absorbs and takes away from the glue line. Under standard conditions more area of glue line is cured per kilowatt per minute gluing softwoods than when hardwoods are glued. The denser woods have greater weight and more heat is required to heat the greater



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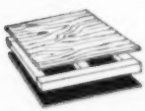

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weight. Glue is usually required to be formulated to suit varying wood density and in the electronic press, dense, non-porous woods are held under pressure for a delay of a short period, from 12 to 14 seconds, before electronic power is applied; open-grained and less dense woods can be cured with less delay after the press is closed.

The electrical factors affecting dielectric losses or heating of wood in electronic gluing, as described by John M. Yavorsky in an F.P.R.S. paper on "Research in Electronic Wood Gluing," are:

1. Dielectric constant which is a measure of the polarization which occurs in an insulating material when it is placed in an electric field.

2. Power factor which is a measure of the power dissipated in watts in a dielectric material compared to the total power factor available in volt amperes.

3. Loss factor which is a measure of the energy dissipated as heat in a dielectric material, and is equal to the product of the dielectric constant multiplied by the power factor.

4. Resistivity or its reciprocal conductivity which are measures of the ability of a material to conduct electric current. Both resistivity and conductivity are generally evaluated in terms of a cube of dielectric material measuring one centimeter in length, width and thickness.

A listing of "Characteristics of Common Dielectric Materials" appearing in the Cathode Press publication Machlett Laboratories gives the following factors for use in preliminary calculations:

	Dry Hardwood	Dry Softwood
Weight in lbs. per cu. ft.	50.	32.
Specific heat in Btu per lb. per degree F.	0.42	0.40
Power factor	0.03	0.065
Dielectric constant	3.0	5.0
Loss factor	0.09	0.32

Note: The above values are necessarily approximate, since they may vary considerably with changes in temperature of material and operating frequency of dielectric heater. Effective power factors are probably somewhat less than those shown due to distributed capacity of shielding cage and electrodes.

Electrical properties have also been evaluated for many species of wood by various authorities and are available in published form as an aid for better electronic gluing procedures. Aside from varying dielectric considerations, different wood species require different glue formulations and various degrees of machining to produce a good bond. Coarser grained woods, for example, require more body in the glue than do close grained woods. On the other hand, weaker woods do not require as fine a degree of smoothness on machined mating surfaces as do stronger woods. The proper glue to use for individual wood species application should be a selection based upon the advice of a reputable adhesives manufacturer.

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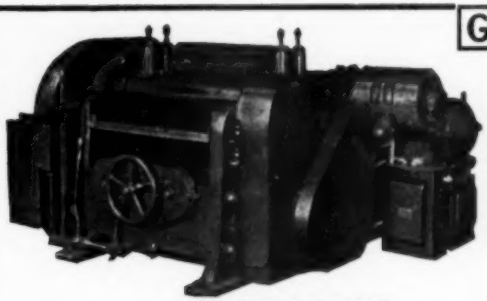

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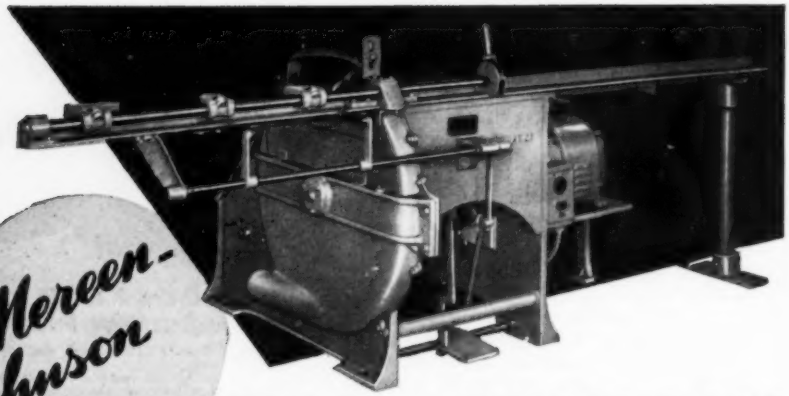

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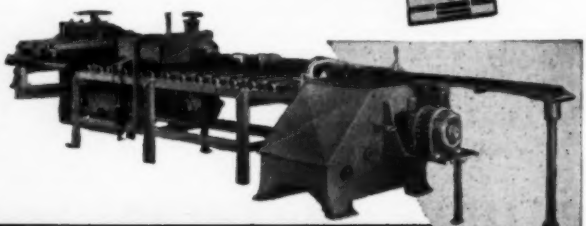

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RELOCATABLE HOUSING

By E. McDaniel

IT was in December, 1951, that the subject of relocatable housing was studied at the request of the United States government. The Housing and Home Finance Agency authorized a program to test the feasibility of using housing of this type as an alternative to the temporary housing that was being used in defense areas. Relocatable housing, while using many of the methods of manufacture found in building prefabricated homes, differs from "prefabs" in that the relocatable house must be movable. That is, it may be in one location today and in another tomorow. In the various tests conducted the homes were moved a distance of 100 miles and then re-erected.

The government program selected eight housing systems and then analyzed structure, appearance, movability and other factors. As a result of this study, it has been found that relocatable housing can be competitive in quality, livability and price with fixed-to-site housing.

The Problem

There are three instances or situations where defense housing is needed. First, there are construction projects and military staging operations where the housing need is known to be of temporary duration. These requirements are met with temporary barracks and mobile family housing such as trailers. This housing is intended to be disposed of when it has served its purpose.

Then, the expansion of defense plants and military installations creates housing requirements that are known to be of permanent duration in the emergency and post-emergency period. These requirements are met with conventional fixed-to-site housing. Such housing becomes a part of the community.

The third situation is found where defense activities create a critical requirement for good family housing, but no assurance that the need will exist for the 20 or 30 years sufficient to amortize its cost. Relocatable housing is the answer to this situation.

To define the term a little more—relocatable housing is that housing which can be moved and reused at one or more locations with a relatively small expenditure in labor and materials.

The two-bedroom house manufactured by Acorn Houses, Inc.

The Procedure

The first step was to develop performance standards and specifications for relocatable housing which would be comparable in quality, livability and cost to fixed-to-site housing. Next, industry was asked to submit data on housing systems that conformed to the performance standards. More than 35 companies, including home builders, trailer manufacturers, prefabricators, etc., responded. Eight types of relocatable houses were selected for demonstration and tests were scheduled in various parts of the country. These included: Transa-Housing, Inc., Long Beach, Calif.; Mobilhome Corp. of America, Bakersfield, Calif.; Gresham Construction Co., Santa Clara, Calif.; Nicoll Lumber Co., Redwood City, Calif.; South Bend Fabricating Co., Seattle, Wash.; Pressed Steel Car Co., Chicago, Ill.; Acorn Houses, Inc., Concord, Mass., and Home Building Corp., Sedalia, Mo.

Photo showing how sections of the Acorn home are unfolded after placement on its light steel subframe.

In this article we shall describe and illustrate the housing constructed by Acorn Houses, Concord, Mass.; Mobilhome Corp. of America, Bakersfield, Calif., and Pressed Steel Car Co., Chicago, Ill.

Preliminary Findings

Each type of relocatable housing studied had particular advantages. Some achieved a high degree of portability at some sacrifice in space and arrangement. Some were less conventional in appearance, but provided greater durability. Some required special highway permits and were limited in shipping distance, but had

View showing Mobilhome assembly line setup.

lower relocating costs. Even with the wide variety of defense housing requirements, the result of this study would indicate that particular requirements for various areas can be met.

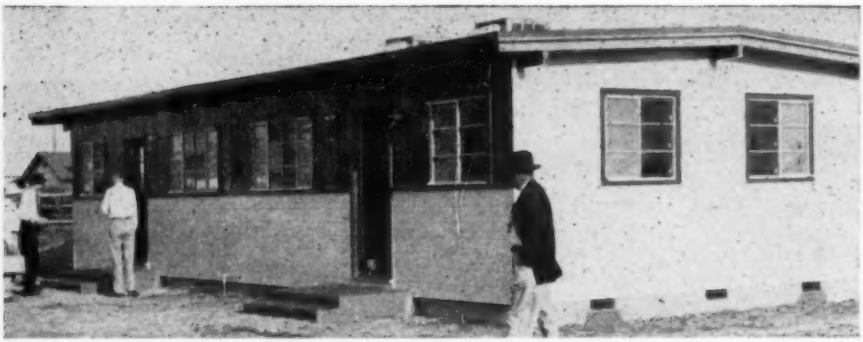
It can also be shown that relocatable housing is competitive in quality, livability and cost with fixed-to-site housing of conventional construction. The average size of the houses used in the tests was 852 square feet of floor space. The average estimated costs of these houses in quantities of a hundred units was $7,747 including 100 miles of transportation but not including land. Allowing $1,000 for land costs, housing of good quality can be obtained for the defense areas for about $10 per square foot. This is in line with the cost of housing of equal quality in various parts of the country.

The following operations were considered in the relocation cost: 1) pick-up from foundation and load for transport, including utility disconnections; 2) haul 100 miles and return crew and equipment; 3) prepare site, including rough grading, foundation and 30' utility connections; 4) install house, including placing on foundation and finishing; 5) finish grading and installing a slab walk. The average cost was $766 and time ran about 180 hours.

Acorn Houses

Acorn Houses, Inc., of Concord, Mass., was included in the government's relocatable house program because the house met the requirements for this type of housing, but not because it was originally designed to be portable or relocatable. This firm manufactures a full size house and in addition a

Mobilhome leaving factory for erection.

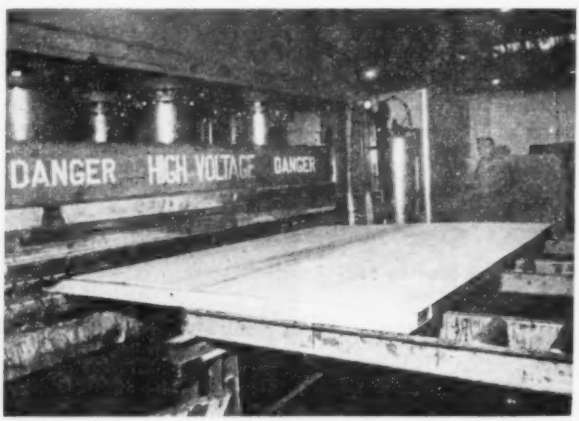


Inspecting Mobilhome after concrete work has been completed and utilities connected.

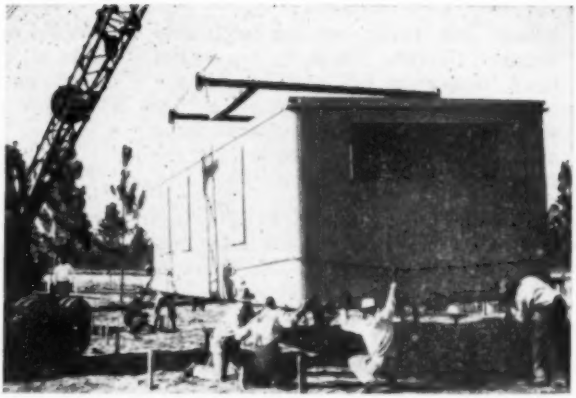
smaller folding unit, measuring 15'x23' inside when erected. When folded for transportation the unit measures 8' x 24'. The unit can be transported on light dolly-type equipment.

The Acorn house is constructed around a central core unit which permits factory installation of all plumbing, heating and kitchen facilities, as well as most of the wiring. The remainder of the house structure is made up of large panels, completely factory finished inside and out with windows and doors installed.

These panels are all hinged to the central core unit so the erection of the house is reduced to the simple unfolding and bolting together of the panels. The panels are honeycomb sandwich structures. They consist of two faces of plywood, Masonite, Formica or other sheet materials bonded to each side of low density paper core material. The core consists of phenol-impregnated paper built up by various methods to form a structure of cells, resembling a honeycomb. The faces are bonded under heat and pressure to the core with a waterproof resin, making a panel of unusual strength and rigidity in proportion to its weight. The core material functions both as structure and as thermal insulation. They are made



Unishelter begins its life here on this superpowered electronic press at the Hegewisch, Illinois, plant of Pressed Steel Car Company.



Unishelter, manufactured by the Pressed Steel Car Co., is quickly set up at the site. At an official preview, a fully furnished, five room and bath Unishelter was demounted, taken to a new site a mile away, erected and furnished in a period of 92 minutes.

in 2" and 3" thicknesses and in sizes up to 8' x 24'. A 2" panel faced both sides with ¼" exterior fir plywood weighs roughly 2.25 lb. per square foot.

Acorn Houses, Inc. was incorporated in 1947 for the purpose of developing prefabricated houses. The firm's plant facilities include a gluing machine, core sawing equipment and stretcher, drying room and curing oven. The hot press for bonding panel faces onto the honeycomb core can produce more than 2,000 sq. ft. of paneling in an eight hour shift. In addition to the specialized equipment, the plant is equipped with a variety of woodworking tools—cutoff and table saws, planers, jointers, band saws, routers, sanders, drill press and portable electric tools.

The Acorn house has a number of built-ins which contribute toward the building's efficiency. Storage units which separate the bedrooms are built of wood frames and tempered hardboard. Cabinets in the kitchen are also of wood and hardboard. They have a total 103 cu. ft. of storage space. Bookcases, tables and desks have also been built in to give the house an atmosphere of livability.

Pressed Steel Car Company

This firm has termed their house the "Unishelter." Two hundred fifty-eight

Unishelter's attractive, spacious living room. The photograph used as the heading of this article shows the exterior view of the house.

houses are being set up at Camp Stewart, Georgia. These houses do not have basements, but each one has a utility room containing furnace, hot water heater, etc. The bedrooms have cross ventilation and the bathrooms are fully equipped.

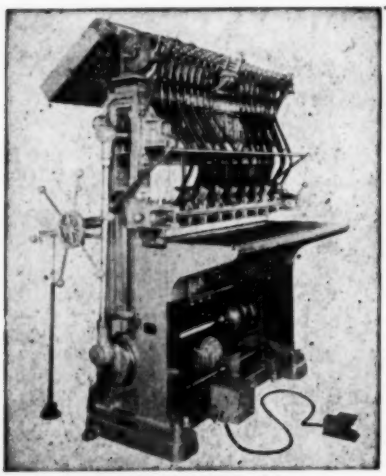
The Unishelter house is built in three main sections, each built on the Unicel principle. The stressed-skin monoccoque construction embodied in the Unicel system pioneered by Pressed Steel Car for its Unicel freight car and later its highway trailer, is applied to this house.

The external walls, floors and ceilings are fully insulated with fiberglass insulation. This, of course, has the effect of holding the heat in northern climes, as well as tending to keep the heat out in southern locations. The insulation is placed between the skins at the time the cellular sections are assembled

Phenolic or resorcinol type resins are used in the assembly. The gluing operations are usually done in large electronic presses.

In the design of the house, careful consideration was given to the use of materials that are readily available. As a result, all of the structural plywood, as well as the solid structural members, is of Douglas fir. No hardboards are used in the house. Other wood members may include western hemlock, spruce or pine, according to supply conditions. Interior walls, floors and ceilings are plywood. All floors are covered with vinyl plastic floor covering.

Both the two-bedroom and the three-bedroom houses are made up of three main sections, enclosing the same functional rooms. The houses are arranged in the shape of an "H" with unequal legs. The connection section of



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SENECA NOVELTY COMPANY, INC., SENECA FALLS, NEW YORK

"Increased our production giving better quality of work and are very economical. Saves us $200.00 per blade per year in sharpening and repairs."

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the "H" is the utility section—approximately 12′ x 10′ and contains the front entrance, connecting hallway, bathroom, utility room and the plumbing for the kitchen.

The second section includes the bedrooms and a part of the hallway. The third section contains the living room, dining room, storage and the rest of the kitchen.

The interiors of the houses at Camp Stewart are being painted a variety of colors. The overhanging eaves have a functional as well as an esthetic purpose. Wood kitchen cabinets have been used throughout.

Mobilhome Corp. of America

This firm has constructed 100 relocatable two- and three-bedoom dwellings at Hawthorne, Nevada, for the U.S. government. These homes have hardwood flooring and walls and ceilings made of Gypsum board. Exteriors are painted in a variety of colors.

These homes are constructed on a factory assembly line which might be described in seven steps: 1) basic construction of floor assembly and rough plumbing; 2) studding, exterior walls, interior partitions; 3) basic roof construction, wiring and shingling: 4) dry wall finish—sheetrock, tape and texture walls; 5) finish carpentry, tiling, linoleum, plumbing fixtures; 6) painting, hardware, electric fixtures, floor finishing; 7) delivery by truck and especially designed trailer.

The complete floor platform of the Mobilhome is constructed to match the prepared foundation. The walls are lifted into place by overhead traveling crane.

In addition to the house studied in this government program, the Mobilhome Corp. has homes ranging in price to $16,000. This is a ranch style, three-bedroom home with many extras.

In cases where transport of a house as one unit is not feasible, this company splits its house into two sections. Each section measures 12′ wide.

Conclusion

This program, started by the government, may usher in an entirely new concept of home building. In the far range view, it may be possible to buy a home and take it with you!

AMERICAN WOODS

The various short articles we have been carrying on American Woods have been made up in booklet form. The booklet describes 88 trees. Send 25c to the Editor, WOOD WORKING DIGEST, 222 E. Willow Ave., Wheaton, Ill. for your copy.

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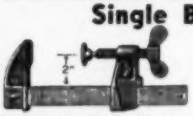

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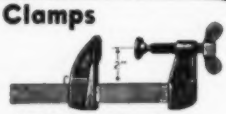

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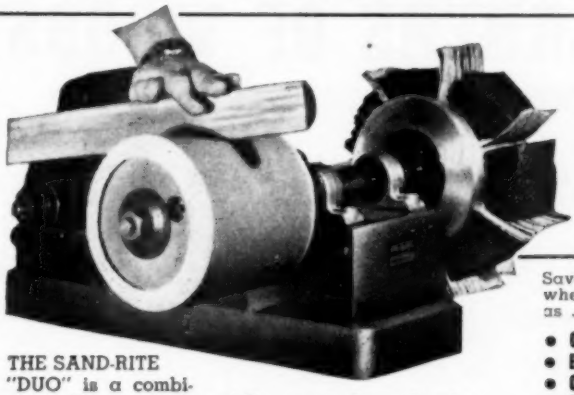

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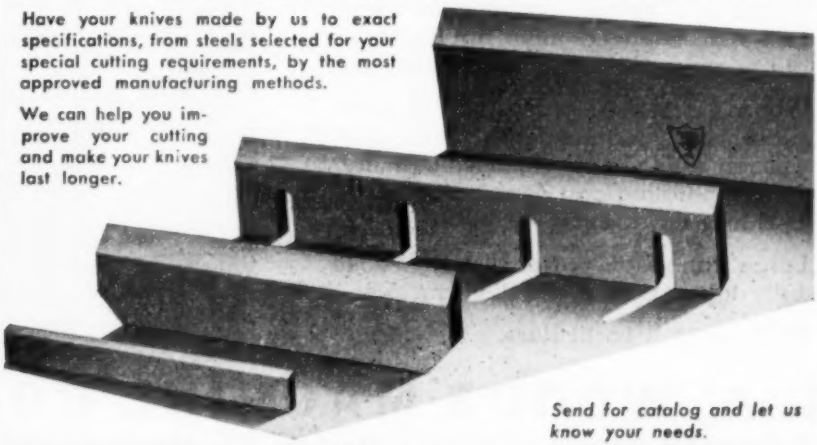

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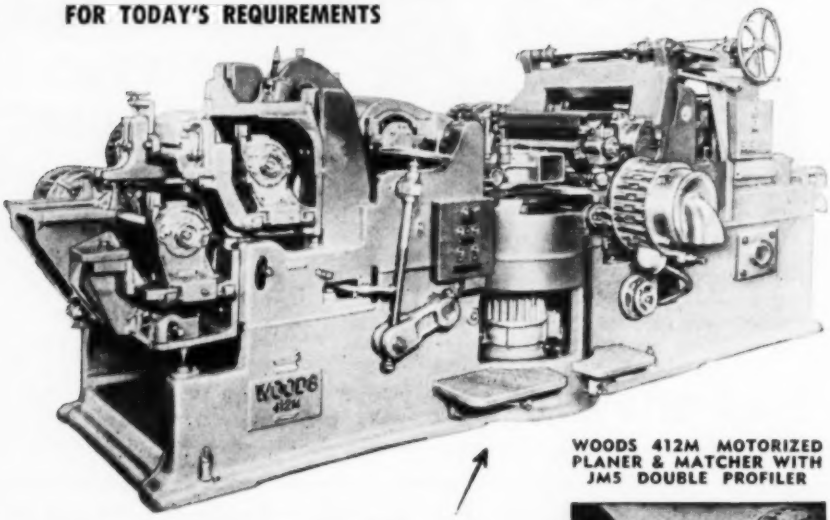

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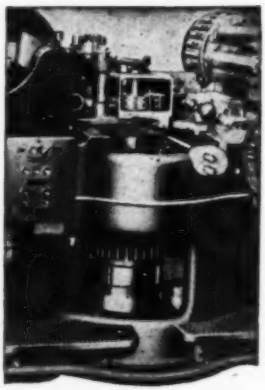

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From HANDMADE to MASS PRODUCED *Wood Furniture*

By N. C. Brown

THROUGHOUT the past century there has been a gradual development from the small handcraft shops making a few pieces of furniture per month to the larger establishments making thousands of finished pieces per month finally to many of our great American plants each producing more than $1,000,000 worth per year. After the Civil War and notably during the period of 1870 to 1890 there was a marked expansion in the furniture business. With the introduction and use of veneers and plywoods, much of our furniture, particularly desks, bedroom suites and tables, were made with fine veneers. Accompanying this came the imitation finishes of mahogany, walnut and some other woods. As the population advanced westward, the furniture business gradually moved to the middle west and to the south which were nearer to sources of timber supply, enjoyed lower labor costs and also provided lower transportation costs.

Accompanying these changes from the bulging population and westward expansion of the eighties and the prosperous and gay nineties, there came about a change from the multi-storied factories to one story buildings to avoid the use of elevators and therefore reduce interdepartmental transportation costs about the plant. This type of building also provided for better lighting and ventilation facilities as well as for straight line mass production. Concurrently there has come about a transition of location from the larger to the smaller communities in order to avoid traffic congestion and provide parking facilities during the automobile age of the past 20 years. These changes also provided more and better storage facilities for raw materials as well as for the finished product at lower overhead and also lower rental costs.

Concurrently with these changes came a movement away from the classic designs and artistic beauty of manually made period furniture to the more livable, comfortable and attractive product of the mechanized precision and mass production stages of the present area.

Significant Developments and Achievements

Time and space do not permit details of a century of progress in this paper. Therefore from a long range perspective, some of the outstanding landmarks of development and achievements in this great industry can be suggested. Some are still in the making. Most of them have characterized the rapid progress made in more recent decades.

With the changing styles and popular demands, women with their keen and intuitive sense of propriety, good taste

Bedroom furniture popular some years ago. The same intricacy of decoration is found here as in the dining room furniture.

and comfort, have had a great influence on the acceptance of the finished products. Their influence has been more important than the masculine.

Among the many distinctive achievements may be mentioned the following. No small credit must be attributed to persistent and effective research in discovering and developing new and better methods and processes.

1. KILN DRYING. A better knowledge of the technical properties of wood and especially the developments of kiln drying methods of lumber, veneers and dimension forms. Hardwood lumber has traditionally been air seasoned at the sawmills and then kiln dried at the furniture plants. It is well known that kiln drying means more than heating and moistening the air in which lumber is dried. Many defects that have developed in furniture have been due to unsound methods followed in the dry kilns. Moisture content has been studied with better results, in not only the manufacture but in the many finishes and durability of furniture in use.

2. GLUES. Vastly improved bonding agents, notably since 1930. Particularly with moisture and heat resistant glues. Empirical methods in furniture plants have played an important part in developing adhesives that have met the test of time with various applications and requirements. It is believed with the passing years still better glues will be developed and used. But efficient glues to meet the requirements of various woods, surfaces, moisture content, curves and stresses and strains, have been developed. This has been an outstanding achievement in the furniture industry. One of the methods of using these highly moisture resistant adhesives has been the multi-opening hot press. This produces a chemical transformation in the resin adhesives and renders them far more moisture resistant than was the case with the older glues which hardened by the evaporation of the solvent.

3. HARDWOOD DIMENSION. Hardwood dimension consists of small pieces of hardwoods of varying thickness and length. It is produced from any hardwood species. The largest production is from red gum followed in popularity by yellow poplar, oak, maple, cottonwood, and to a lesser extent by ash, birch, beech, tupelo, black gum, black walnut and mahogany. These are used chiefly by manufacturers of furniture. There are more than 200 separate prod-

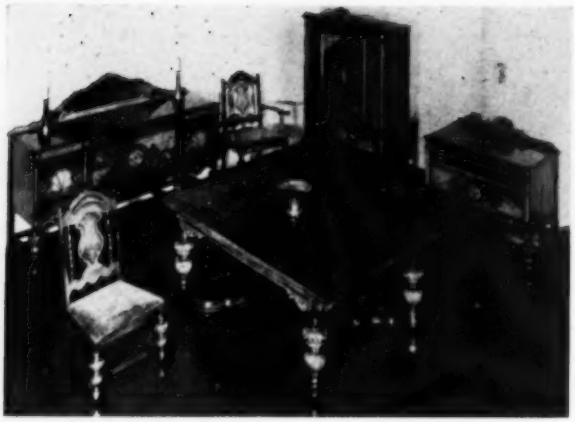
A contemporary living room shows good use of wall storage space. Davenport is full size, but simplicity of lines minimize size.

ucts utilizing hardwood dimension. A large share consists of kiln dried dimension. Louisiana, Mississippi, Arkansas, North Carolina and Michigan are important sources. It is impossible to produce dimension from slabs and edgings under the conditions of high labor and handling costs.

Within recent years, there has been a very progressive and active improvement in the hardwood-dimension industry. The products of this industry offer important advantages in utilization over those of regular hardwood lumber because the users of the finished products receive stock cut to sizes required by them. Therefore, waste is greatly reduced, the production of the finished product is made less expensive, considerable economy results from not shipping defective lumber in the final article, and less space is required in the assembling plant—generally a furniture plant. Furniture plants in some instances can increase their production of finished furniture 20% to 30% by purchasing kiln dried dimension. Also, conservation of our forests is furthered by better utilization.

Typical upholstered chair of more than 20 years ago. Note how modern chair in contemporary living room has kept some of these lines, but has simplified them.

This industry is often referred to as a "feeder" industry to the furniture manufacturers. It is concentrated largely in the production of furniture parts including kiln dried rough, semi-machined and completely machined parts. In particular, the parts made for the furniture industry are largely furniture tops, cores, drawer sides, fronts and backs, bed rails, hardwood upholstered frames, radio and television cabinets and sets. The principal producers of hardwood dimension are organized in



Dining room furniture of some twenty years ago. Note ornate carvings and massiveness of furniture.

the Hardwood Dimension Manufacturers' Association of Nashville, Tenn. Many members produce specialty kiln dried furniture dimension lumber, either flat stock or squares, or cut and equalized to specifications.

4. IMPROVED MACHINERY. The development of precision machines and labor saving devices for high speed and mass production. As with American industry generally, the rising labor costs have seriously embarrassed many furniture manufacturers as well as contributed to the high costs of the finished product. The inventive genius of mechanical engineers in improving machines and methods has contributed greatly to the American furniture industry.

Among these may be mentioned the following distinctive improvements in the design of woodworking machinery.

A. The change from poured babbit bearings to high speed roller bearings.

B. The clumsy belt drives have been superseded by individual electric motor drives with frequency changes for speed regulation.

C. The transition from hand tempered carbon steels through the tungsten and

Another style of dining room furniture popular about 1930.

Junior dining group shows the trend toward blending of modern and contemporary.

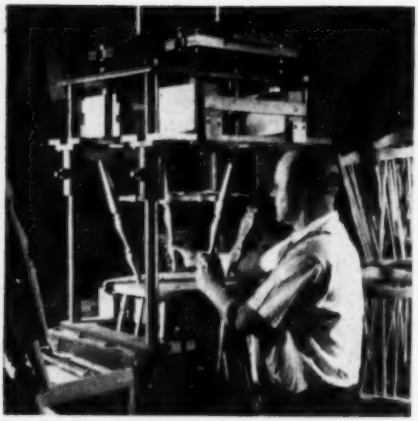
molybdenum alloys which are hardened by accurate metallurgical techniques to the modern carbide-tipped cutting tools. This has greatly lengthened the cutting life of the tools between sharpenings.

D. Operating speeds have been increased from about 2,000 R.P.M. to over 20,000 R.P.M. on a modern router.

E. Combination machines which incorporate a sequence of automatic steps in machinery.

5. HIGH FREQUENCY ELECTRONIC TREATMENT OF GLUED PARTS. This feature has received great impetus during and since World War II, especially in assembling glider parts such as spars and ribs of airplane wings. Since the war, the outstanding contribution of electronic gluing has been in the edge-bonding of solid panels and core stock in the furniture industry. There are now about 200 installations of this kind and they are constantly

A brunch table with stacking stools. Antiqued iron pulls and hinges require no polishing. The desert sand finish does not show dust or fingerprints.



Modern chair assembly. Putting legs and stretchers in a Windsor chair.

increasing. The assembly gluing of case goods, chairs and other furniture parts is on the increase. This also gives promise of much wider application in the years to come. The assembly of precision machined hardwood dimension parts is a field yet to be applied. However, the inherent advantages of electronic gluing lend themselves to a much wider usage.

At present the initial cost of electronic gluing equipment militates somewhat against wider installations especially in the smaller wood furniture shops. However, the savings that may be effected by use of electronic gluing equipment in both materials and man-hours usually more than compensates for the relatively high initial cost.

The advantages of electronic gluing are:

1. Substantial reduction in clamping time under pressure. For example, it may require only from 1 to 1½ minutes for electronic treatment as contrasted with ½ hour to 4 hours or more for cold setting.

2. Reduction in number of jigs and fixtures for assembly parts.

3. Greater durability of a heat-cured glue joint over one set at room temperatures.

4. Savings in value of process inventories due to shortening of operating cycles in the factory.

6. IMPROVED PRODUCTION MANAGEMENT. Better production management is found in furniture manufacture due to the growing and wider range of improvements in techniques. These techniques and methods may be summarized as follows:

1. Streamlined production control systems.

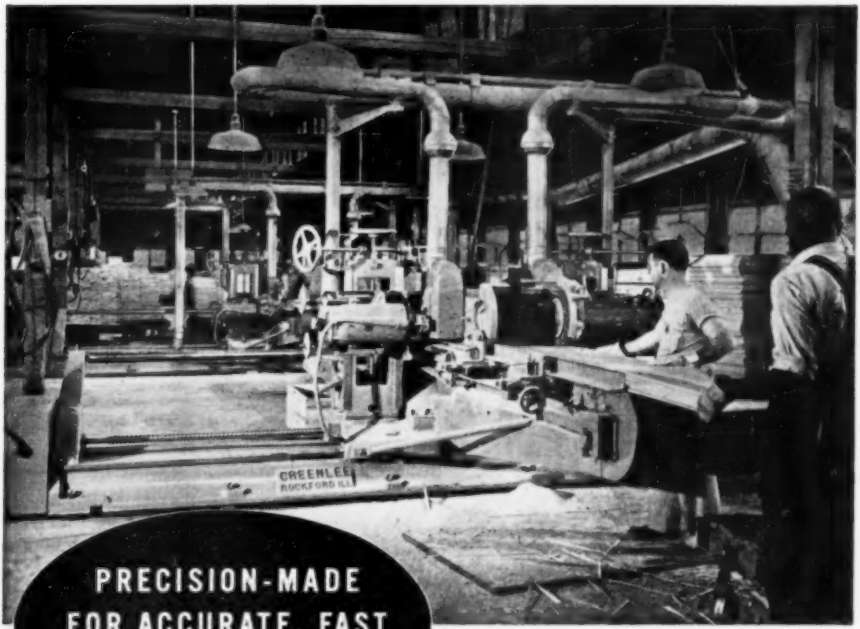
2. Use of standard data for time and cost studies. This is largely a matter of good record keeping.

3. Use of labor saving devices such as jigs, fixtures and other new mechanical devices.

4. Use of improved tools and machines. An example is the carbide tipped saws.

There has been a growing emphasis on labor saving methods, including materials handling which directly adds no value per se to the product, but adds

Boring holes in seat for Windsor chair.



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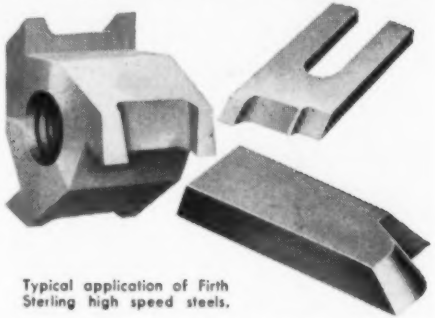

Typical application of Firth Sterling high speed steels.

tool steels, in all grades required by the woodworking industry, and standard or special shape carbide tips and blanks for saws, milling

may have learned the hard way on a milling cutter, draw bench or press, but he *knows* the ...

He can give you an unbiased recommendation . . . because he has approximately 100 different grades of Firth Sterling high speed steels, and tool and die steels to choose from *and* a dozen grades of tungsten carbide in everything from die nibs to a virtually unlimited variety of standard and special carbide cutting tools and tips.

All this is backed by 64 years of leadership in the development and production of special purpose steels, and 21 years of pioneering in carbide and "powder metallurgy" applications.

It makes sense, that a company which engages in *all* phases of tooling metallurgy will serve your interests best.

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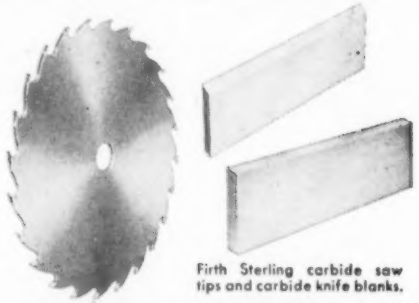
standard or special shape carbide tips and blanks for saws, milling cutters, knives, and special tools.



Firth Sterling carbide saw tips and carbide knife blanks.

Consult your tool manufacturer . . . your regular source of supply. He can get prompt service from manufacturing facilities and commodity stocks in Pittsburgh on both steel and carbide.

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up to about one-third of the cost of manufacture. This is one of the logical and more important fields to study, the most productive field in which to make improvements. Altogether, the largest gains have been made in reducing costs in this field. The result of conveyorized yards and rough mills, even to the conveyor handling of both dimension and waste produced, has resulted in lower production costs.

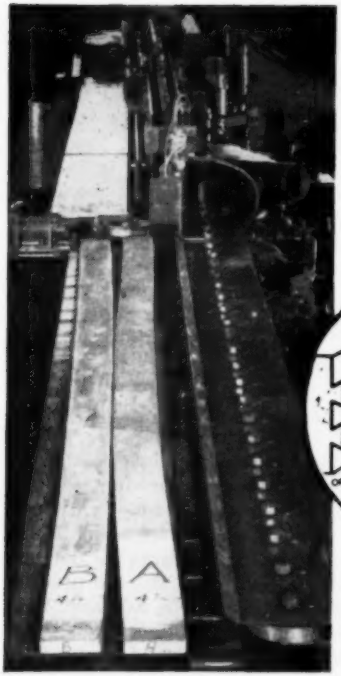
Packaged - handled lumber by lift trucks is an outstanding example of improved handling techniques. Directly related to materials handling is the plant layout problem. Recently constructed plant buildings provide for more efficient layouts in terms of materials handling.

An illustration of this awareness is the establishment of a new course in furniture management and salesmanship at the North Carolina State College at Raleigh. This course is underwritten by the Furniture Foundation which is supported on an assessment basis by the furniture industry of the South.

7. USE OF QUALITY CONTROL METHODS. Quality control is the operation of making certain that the products from a factory, mill, or assembly line conform to standards set by the manufacturer's or buyer's specifications. It is the most important phase of production management. Quality control men do not wait for the final inspection of the finished product to discover defects and discard material not up to specifications. They detect defects in the manufacturing process as they occur. Sometimes this is done by constantly sampling parts as they pass through the operation. Serious losses have occurred during the manufacturing processes. In one instance a wooden product was not properly located in the machine; in another a slight alteration in the tooling was necessary. In the third example tool-sharpening habits had to be changed. Many thousands of dollars have been saved in some instances through the reduction of rejected goods which generally takes place on final inspection. In this way, production costs are reduced by detecting, as they occur, improperly manufactured products that fail to conform to specifications. Thus, quality control employs the law of probability in detecting trouble in a production line or manufacturing process before the defective goods accumulate.

In other industries, particularly automotive, electrical and aircraft, the techniques of statistical quality control are employed extensively. The woodworking industries are only beginning to use this methodology in an important way. Awareness of the importance of quality control in manufacturing furniture is apparent from many papers and articles written on the subject. However, there has been more written about the subject probably than has been actually introduced and put into effect in many of our furniture plants. The reason is that the industry doesn't have properly trained quality control analysts to implement an industry-wide program. The statistical methodology is perhaps the most useful tool for controlling quality. Its use will be eventually forced upon the furniture industry due to severe competition both from inside and outside the industry. The manufacturers are, in general, not asking for further development of statistical techniques applying to woodworking. Rather the relatively little use that is made of it comes about when recently trained men are hired and given opportunity to put their training into effect. The applications are almost unlimited. This holds true of the prospective benefits as well.

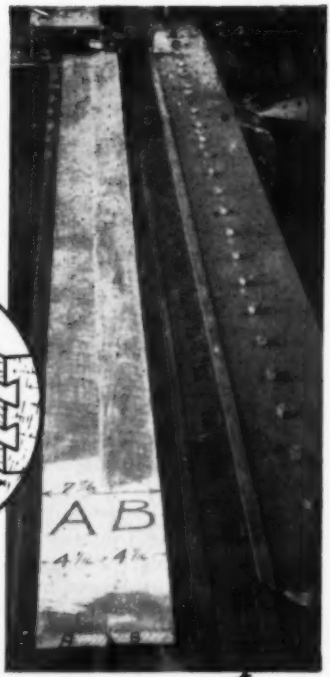
8. FUNCTIONAL DESIGN. A more durable, better structurally designed and greatly improved appearance.



Two 1x4s before going through the machine. Note the 1½" irregularity. Only ¼" is lost in processing, including edge trimming.

The same boards after being assembled automatically into a 1x8 panel rated as "one-piece stock."

Key to the strength of the joint is the self-locking double-tapered dovetails automatically formed during the process.



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The cull stock is fed through the machine at up to 100 ft. per minute. The machine automatically straightens the lumber, edges, dovetails, glues and assembles it into double width panels.

The process is practical for 10 to 16 ft. lengths and for final panel widths up to 12". It is applicable to many woods including Southern yellow pine.

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9. DENSIFIED OR MODIFIED WOOD. Wood densification is a process of improving wood to make it more useful for specialized purposes. At first, this product was known as improved wood—also as modified wood. It consists of filling or closing the voids in the cellular wood structure accompanied by compression under heat. This process adds hardness, increased strength, greater durability and dimensional stability. In some forms, however, the process reduces toughness, and in all cases it makes the wood much heavier. Compression of wood fibers is generally accompanied by impregnation with phenolic resins and urea resins. By some methods, compression of wood is done without impregnation. Impregnation with phenolic resins is usually in veneer sheets, ⅛" thick and laid up with parallel grain direction before pressing. Impregnating thick, solid wood is a very slow process. Variable density may be secured by tapering down the length of alternate layers and pressing to a uniform thickness. In other cases, impregnated veneer layers may be placed outside an assembly when surface hardness and light weight are required; or they may be placed inside where a readily glued surface is essential. Commercial products are of the resin-impregnated type variously known as Compreg, Pregwood, Pluswood, and, when pressures do not exceed 200 to 500 lb. per sq. in., the product is known as Impreg. In England, it is known as Jicwood. When various types of paper layers are used instead of layers of wood veneers, the final product is known under various technical and trade names such as Papreg, Consoweld, Formica, Micarta, Panelyte and others. Many kinds of densified wood and fiber were especially valuable for military equipment during World War II where costs were not considered an important factor. Some of these products have found useful outlets in several branches of the furniture industry, especially table and desk tops, legs and other similar parts.

10. THE SMALL HOME. The influence of the increasing number of small and servantless dwellings has an influence on the character of furniture. The small rooms of the four and five room, one-storied home or small apartment built during the past decade require the maximum utility of nearly all types of furniture. This has meant designing furniture to better meet the smaller size rooms and at the same

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time maintain adequate comfort and living facilities. For example, women prefer the maximum drawer space in dressers to the greater convenience of the knee space so prevalent in former years. And Hollywood beds with combination headboard and shelves or chest which give maximum comfort and attractive appearance with minimum space are typical of recent years.

11. FINISH COATINGS. This century has witnessed the transition from the shellacs and varnishes derived from natural sources to the chemically developed and compounded synthetic finishes which bring out the natural beauty and figure of wood. These newer finishes have far more permanence than the formerly used materials and can be formulated for quick drying in either gloss, semi-gloss or matt effects.

Chronology of Progress in the Furniture Industry

Some of the noteworthy landmarks in the advance and development of the American furniture industry from 1850 to 1950 may be briefed as follows:

1850—Furniture was handmade in small shops similar to specialized custom shops now found in the large cities.

1850—Annual value of furniture was $15,000,000; 37,000 employees; total population 23 million.

1854—Death of Duncan Phyfe after 86 years devoted largely to service in designing and making furniture of indelible influence.

1860—Furniture production reached an annual value of $25,500,000.

1865—68 Mayo patents for plywood.

1868—Eastlake's book, "Hints on Household Taste" influenced furniture making and trends.

1868-72—Machine-made furniture definitely began to displace the hand craftsman.

1870—Veneer lathes came into use although first patent issued earlier (1840).

1876—Centennial Exposition in Philadelphia gave furniture national attention.

1880—Value of furniture output reached $77,845,000.

Revolving pneumatic clamp for cabinet assembly. All parts machined to shape, requiring no hand fitting.

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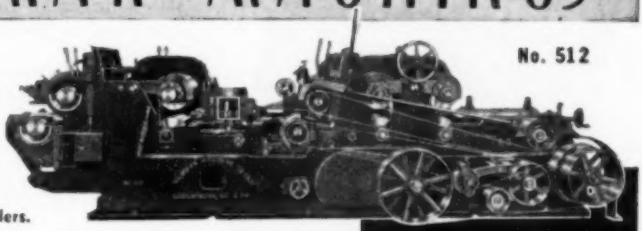

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Speeds up to 325 feet per minute.
8" dia. cutting circle.
Six 12" dia. feed rolls.
Single and double profilers.

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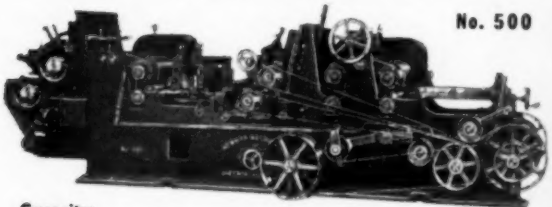

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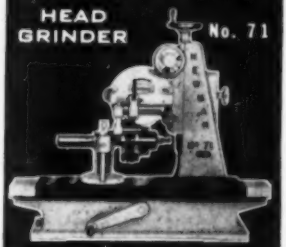

Ball and Roller Bearings

No. 55 AUTOMATIC PINEAPPLE FEED TABLE

The NEWMAN 55 feeds stock automatically to high speed planers and matchers up to 450 lineal feet per minute. Capacity: 30" wide, 8" thick. All adjustments and controls are centrally and conveniently located.

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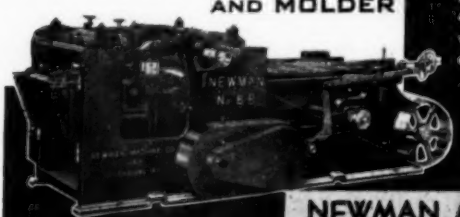

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Name .....

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1880—Grand Rapids, Michigan, and later Jamestown, N.Y., became great furniture centers.

1880—Oak came into popular favor as expanding to the mission types.

1890-1900—Romanesque revival and great developments in woodworking machinery.

1883—First plywood desk tops of 5-ply construction and lumber cores.

1888—First furniture factory built in High Point, N.C., increasing to 44 in 1900.

1889—International Paris Exposition revived interest in 18th century product and French influence which continued in the quality furniture field.

1890-98—General use and wide adoption of plywood for furniture.

1895-1900—First 5-ply hardwood plywood with lumber cores and figured veneer faces used in furniture.

1900-12—Invention of many mechanized devices to speed up production.

1910—Red gum began to be extensively used, especially by southern manufacturers, and quickly rose to comprise 60% of medium grade furniture.

1910—Rotary cut Douglas fir veneer for plywood first produced on West Coast.
1910—U. S. Forest Service established Forest Products Laboratory at Madison, Wis.

1914—Furniture factories to the number of 3,192 reported with value of production $266,000,000, with an annual average of about $80,000.

1917-18—Depression hiatus due to World War I.

1919—Improvements in breakfast room, kitchen nook and dinette furniture be-

came popular, especially in small cottages, bungalows and apartments.

1920—Furniture manufacturers and retailers put on a national "drive" to educate people to desire homes that were more attractive and livable. This was very successful, resulting in the Better Homes Bureau, and wide circulation of magazines devoted to improvement in living surroundings.

1921—Southern Furniture Exposition Building costing $1,200,000 erected in High Point.

1923—Red alder came into prominence as a furniture wood in the Northwest, with about 10 million feet used in Washington and Oregon.

1925-30—Rustic furniture from hickory, oak, redwood, willow, sassafras, ash, etc. came into popularity.

1930—Hardwood Dimension Manufacturers' Association founded. This was an important step in providing parts for furniture.

1936—The modern and functional designs became popular as a result of smaller and more restricted living quarters.

1937—Tego film adhesive made available from domestic manufacturers.

1937—United States Plywood Corporation formed, followed by a chain of distributing warehouses from coast to coast.

1939—Molded plywood techniques used industrially for simple and compound curved plywood.

1943-45—Electronic heat applied commercially to cure resin adhesives.

1945-50—Great increase in furniture production due to lack of house construction during war years with tremendous expansion in home building and in the marriages of returning war veterans.

1950—Construction of 1,400,000 homes,

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a new record resulting in great impetus to furniture manufacture.

1950—Mahogany imports of logs and lumber used largely for furniture reached an all-time high of 84,696,000 board feet.

1950—Yearly value of furniture output reached more than 2 billion dollars with use of 2,138 million board feet and a record number of more than 3,340 furniture plants. The average annual production rose to about $600,000 per unit.

A Look Into the Future

Now to crystal-gaze a bit into the future. This is exceedingly dangerous and there is always someone to say "I told you so!" But the past and present give us some basis as indices of future trends. Among these changes that may come to pass are the following:

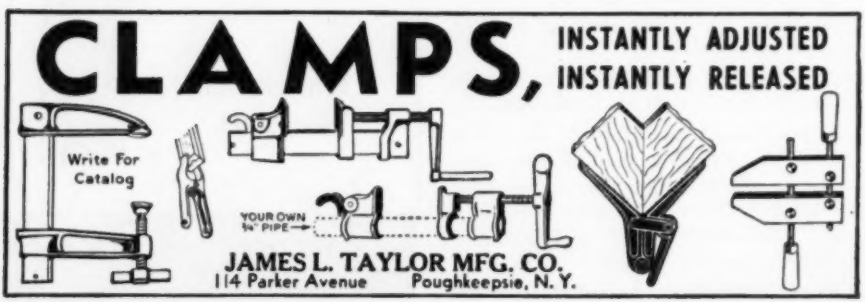
1. Labor and transportation costs are not likely to be lowered. They are vitally important considerations in the entire furniture industry picture.

2. Quality lumber, notably the selects and clear grades, will be more difficult to obtain because we are now cutting almost entirely second growth timber of the Pacific Northwest which does not provide many hardwoods other than alder and a little maple and other species. Therefore lumber costs will continue on a relatively high level. We will have to grow all of our domestic woods for furniture as well as many other products that come from standing timber. Lumber and plywood will cost what it costs to produce them. The products of the logs are becoming progressively lower in quality and require greater skill for acceptable utilization.

3. We must change, if possible, the popular American demand for clear wood. The writer has seen some excellent furniture, pilasters, and other prominent wood uses in Europe fashioned from knotty Southern pine and other woods. The European forests produce mostly what we would call a No. 2 common board. In other words it is knotty, but the knots are small and red and tight and therefore easily machined and properly finished. Under proper design, these natural growths can be made most attractive as can be noted from highly prized early colonial antique items.

4. We will probably use more and more tropical woods. Mahogany, walnut, cherry, birch and maple will continue as standards of quality and price. But just as we have begun to use obeche, cativa, gaboon or okume, satinwood, prima vera and many other woods, we will probably discover and appreciate the advantages of woods not presently used or perhaps little known, irrespective of their origin.

5. A larger proportion of softwoods will be used than in the past; also more veneers and plywood. Today the pro-



portions of lumber used are about 80% hardwoods and 20% softwoods. In 1928, a survey showed 94% of lumber used was hardwood and 6% softwood.

6. Future styles, size and arrangements will be suited to living conditions. Surely our way of living has changed vitally in the past 25 years. Smaller rooms, more convenient and comfortable furniture with more functional designs and labor-saving devices must be provided to meet the trend toward the smaller home with fewer rooms.

7. The furniture business seems destined to move in cycles depending upon house building activity and periods of prosperity. When 1,400,000 homes were built in 1950, this meant a tremendous demand for furniture in those homes. With expanding population there appears to be a highly favorable outlook for the future of wood furniture. Our heritage from past generations has been one of attractive and useful furniture. Great improvements have marked the century under review. It is the obligation of this generation to transmit this grand heritage to those who follow.

Part I appeared in the June issue.

Photographs for this section of the article have been furnished by: Heywood-Wakefield, Timber Engineering Co., the Mahogany Association and the Publicity Department of the American Furniture Mart.

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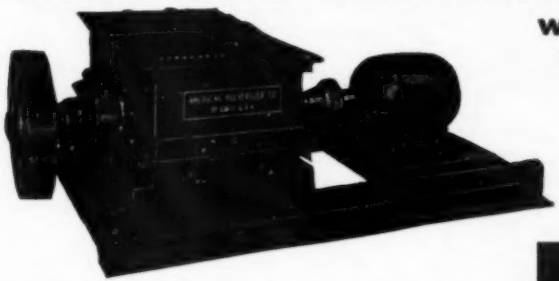

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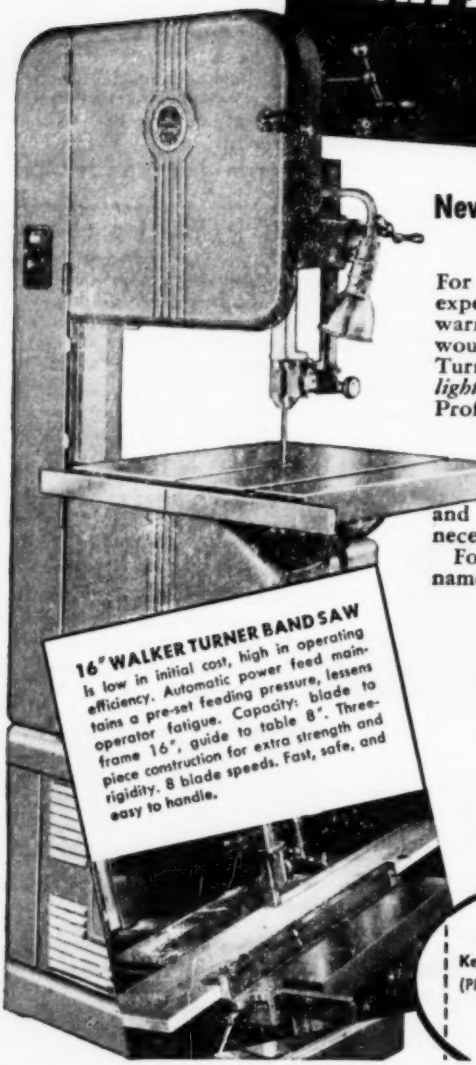

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Expert Management . . .

on a Small Business Shoestring

By Milton H. and Jean Mater

MUCH attention has been given to the problems of small business, and rightly so, for of the estimated 4,000,000 businesses in the United States, by far the largest proportion are small businesses. But when the small businessman looks to the voluminous literature for help with his particular problem, he is often faced with a confusion of definitions. Small businesses have been variously defined as businesses with under 1,000 employees, businesses with under 500 employees, and businesses with under 50 employees.

Obviously the problems of a 2 man machine shop are vastly different from the manufacturing concern employing 50 people. And just as obviously, multiplying the number of employees ten fold brings to the business a different character or aspect.

This article is directed primarily to those businesses employing between 10 and 100, a segment of the business population which has received least attention by experts, though it may be pointed out that in many types of business it may be applicable to others.

Expert Management Essence of Problem

Small businesses of all sizes share essentially the same problems as large businesses. The essential need for both kinds is expert management, differing only in the volume the managers are required to handle, rather than in the kind of responsibilities they assume.

Small businesses must employ the tried and proven methods of big business if they are to compete successfully. The essence of the small businessman's problem is how to obtain expert management on a shoestring.

The trend in industry today is to hire managers to run companies. These are men trained and experienced in coordinating production, selling, community relationships, government regulation and other segments of the business. Under the manager works a skilled corps of experts—experts in engineering, production, accounting, public relations, traffic management, office management, personnel, taxes, sales management, research and a host of other functions.

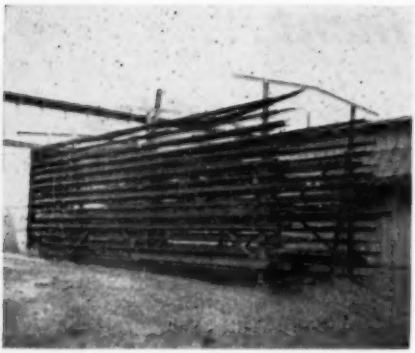
The efficiency of this manager, flanked by his crew of experts, is the competition the small businessman must face. Big business is in a better competitive position, not because of its bigness, but because of efficient management.

Expert administration and advice can be bought, but alas, the price is prohibitive for small business. It is up to the small businessman, therefore, to utilize his ingenuity to run his business as if he had a corps of experts at his call.

The key to competing with big business then, is not to grow bigger, but to obtain expert management at a comparatively reasonable cost.

Steak on a Hamburger Budget

This is telling the businessman he must have steak every day when his budget permits only hamburger—no mean feat! But it is the kind of business



Inventory management is important for the small management profit picture. Can you afford not to have racks to sort and hold stock?

diet no businessman can afford to do without. The challenge is how to do it.

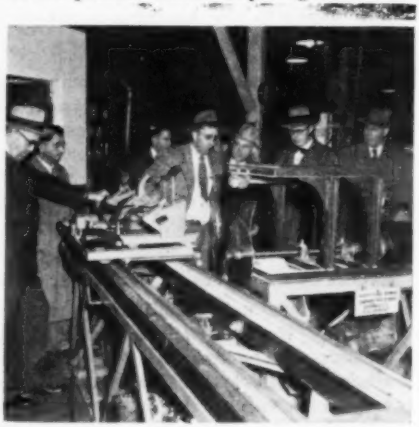
The first step in securing better management is for the small businessman to recognize his Achilles' heel in the business world. Most owners of small plants are thoroughly familiar with one aspect of the business; they may be expert craftsmen or expert salesmen, or expert foremen. Most frequently, small business owners are more expert in the production end, which is the heart of any business, leaving them sadly deficient in the "business" end of the enterprise. A heart existing alone is of little use unless it has arteries to pump the blood through, and body tissues to feed. The same way, production alone is of no use unless it has a circulation system to carry the products to where they are needed. The Achilles' heel—the weak spot—of the average small businessman is lack of knowledge about such areas of management as advertising, personnel relationships, office management and cost accounting.

The Predicament

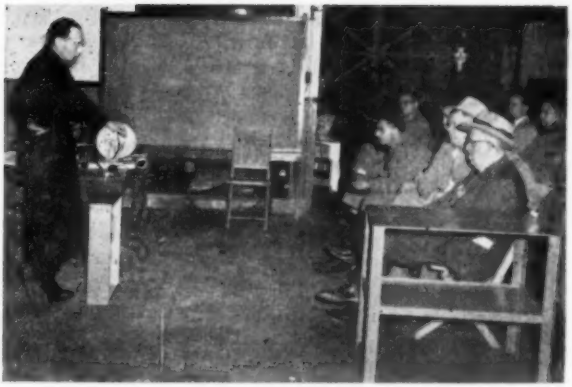
The small businessman's predicament may be illustrated by the story of Bill Harper who owns a small furniture manufacturing plant in the Mid-west. Bill Harper worked in a furniture factory before World War II. Upon discharge from the service at the end of the war, Bill corralled enough capital to organize his own office furniture manufacturing company. With the postwar demand for furniture high, Bill Harper's New Day Office Furniture Company has been successful in sales volume and in over-all profits. Could a businessman ask for more?

Not if the situation remained the same. But competition is increasing. Rival companies are advertising heavily. The demand for certain lines of furniture has increased recently while other lines don't move at all. Harper isn't sure that the line selling now is a profitable one because he has no individual cost figures, only over-all profits.

Nearby, another furniture company employing over a 1,000 people has instituted profit sharing and is attracting skilled workers. The Big Office Furniture Company has also lowered some of its prices which may begin to hurt



The small manufacturer needs to use particular ingenuity in demonstrating his products. Here a sawmill manufacturer demonstrates a model sawmill which he built to illustrate the type of machinery he manufactures.



Personnel control is a new and changing field. Keeping employees informed and happy is part of management's duties, no matter how small the organization.

Harper's sales. The corporation controlling Big Furniture Company owns several enterprises and with the tax picture what it is, they are willing to take a loss on the furniture manufacturing to make up for profits on other lines.

The Big Furniture Company retains a high powered lawyer on a consulting basis. They have a personnel manager, a sales manager, an expert office manager, a first class advertising agency, an excellent accounting department, a well run stock room. They are selling to the same market.

Bill Harper has picked up scattered smatterings of information on personnel and advertising and other practices which require expert knowledge. He knows practically nothing about budgets, profit sharing and cost control.

What can he do without raising his overhead to a prohibitive figure?

The Solution

Bill Harper's first step in making his management expert is to learn the system of organization of big business. He can do this by reading and by observation. Merely knowing that cost accounting and traffic handling, inventory control and advertising are integral parts of running a business is an important advance. Knowing that these areas are sciences which must receive consideration, Bill can proceed to incorporate them in his business. He may need to take over the functions of sales manager, production manager, personnel manager and purchasing department himself, but these duties will be performed instead of neglected.

Furthermore, knowing which areas of business must be considered, he can properly assign other functions to assistants. He employs an office manager now, who with a few assistants, keeps busy with the payroll and billing and other office functions. The office manager can be encouraged to organize the office for efficient operation in accounting and also as an adjunct to a better sales organization. The office manager can incorporate cost accounting and profit control in his work. Mere recognition of the functions which the office manager should take over can lead to a more efficient hiring. Instead of employing a bookkeeper or accountant to head such a multiple function department, a graduate in business and administration, or someone from the business department of a large corporation may be more suitable.

Likewise, the purchasing function may be organized under the engineer or designer employed in the plant, and

a stockroom and inventory control may be organized under the foreman. The plant could be used in this capacity.

The act of listing the big business methods and assigning responsibility within the small business organization for carrying out of these functions is a good first step in better management.

Carrying out the Resolution

Listing the big business methods which his plant should follow is like making a New Year's resolution—carrying through is the difficult part. There are several big business methods which can be inexpensively incorporated in small businesses. Because they are essential practices, often neglected, they will be considered briefly.

Cost Management

Because every business nowadays requires the services of an expert accountant and a bookkeeper, setting up a cost control system is a relatively simple step. For the small manufacturer, many approximations may be used. A cost accounting system tailor-made to suit the needs of a particular plant, requires the talents of an expert accountant, but once set up, the office bookkeeper can easily keep the records. Cost accounting is essentially a record of labor costs, materials costs, and overhead. These figures are usually in the ledger of any plant. A cost accounting system records these figures to tell the cost of production.

Cost accounting is not cost management, however, though it is a prerequisite. The manager must utilize his knowledge of costs in production and control.

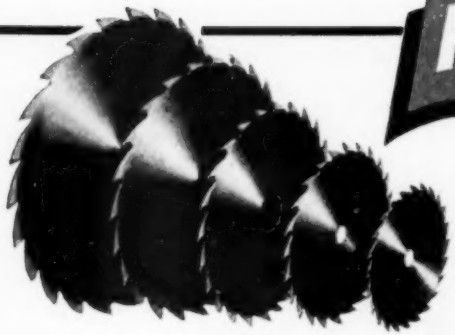
Inventory Management

Is a stock room a luxury or a necessity? Will a perpetual inventory system take more effort than the knowledge is worth? Building racks and a stockroom, setting up an inventory control system, and manning it involves an expenditure, raising overhead. It may be, however, that valuable production time is lost because material is not available when necessary. It may be that in the long run, it costs considerably more to have a man receiving $1.80 an hour, spend a half hour moving a stack of planks to get at the size he wants, than to invest in stock control. Moreover, a stockroom may combine several other functions now carried out in a haphazard fashion. The duties of shipping clerk, internal ordering, plant maintenance, and other miscellaneous functions can well be combined with the stockroom job in a smaller plant. In a larger plant, each of these functions may require a separate department.

Sales Control

Perhaps no area is more difficult for the small businessman to handle than the sales function, particularly if his background has been production. He has had no opportunity to become familiar with the mysteries of advertising and public relations—media, layout, direct mail and market research are strange words in a strange land. The books which he might read on these subjects tend to be detailed and to advise him how to plan an advertising or sales campaign rather than how to get it done. Moreover, the type of personality which makes for a good production man is often antagonistic to the attitude required for sales.

Sales control on a small budget is a real challenge to the small businessman. Fortunately, however, the selling field—including such integral parts as advertising and public relations—is one in which he can obtain outside help at relatively little cost. If a plant cannot afford the services of an experienced sales manager—and a good one who is familiar with all the angles comes high— he may easily find a solution in the employment of a skilled advertising agency. Many advertising agencies



REDCO Carbide Tipped SAWS

...try these important production-builders *in your own plant*

REDCO Rip and Cross Cut Carbide Tipped Saws cut cleaner, faster, longer to effectively boost your high-quality production. These Redco Saws have heavier cemented carbide teeth, precision ground for longer service life. Each tooth is correctly brazed to the blade and pressure tested to 15,000 PSI. Accurate tensioning, gullet design, clearance and cutting angles all result in smoother running and cutting saws. These saws can be sharpened on a Redco Grinder or sent to the plant for 24-hour, "in-out" sharpening service.

Write for complete information on these important Redco production-builders. You'll find it pays to use these Redco Saws that were developed by woodworking men . . . and performance-proved in their own plants.

REDCO **TOOL DIVISION**

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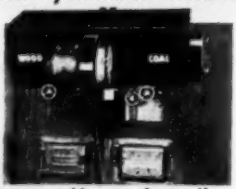

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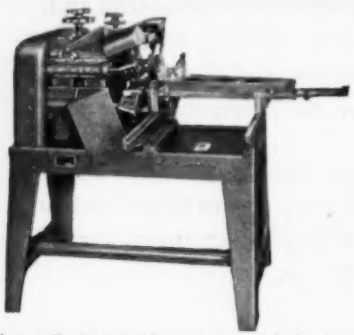

New adjustment allows exact and simultaneous adjustment of tenon spindles.
3 H.P. Motor.
3 Inch Blades
V Belt pulley drive on both tenon and cope spindles.
Heavier Construction for greater accuracy
MILLBURY MACHINE COMPANY
13 WATERS STREET, MILLBURY, MASS.

do considerably more than merely placing advertising. An advertising agency can help produce catalogs, plan sales campaigns, handle public relations, advise on markets and methods of distribution of the firm's products.

Large advertising agencies which handle accounts with large budgets throw in many of these services as overhead deducted from the 15% they receive on advertising expenditures. Where the advertising budget is small, the 15% rebate is insufficient to cover services and the agency usually works on a fee basis. Whether a large or small agency is selected is a matter of individual choice.

Some businesses may find a more satisfactory solution to selling management in the employment of a skilled part-time sales manager. Here, the small businessman must demonstrate his ingenuity and adaptability by tapping some of the sources of trained help which larger business will not take time to use. Semi-retired salesmen, housewives with experience in the field, professors seeking part-time jobs—all these are possible resources.

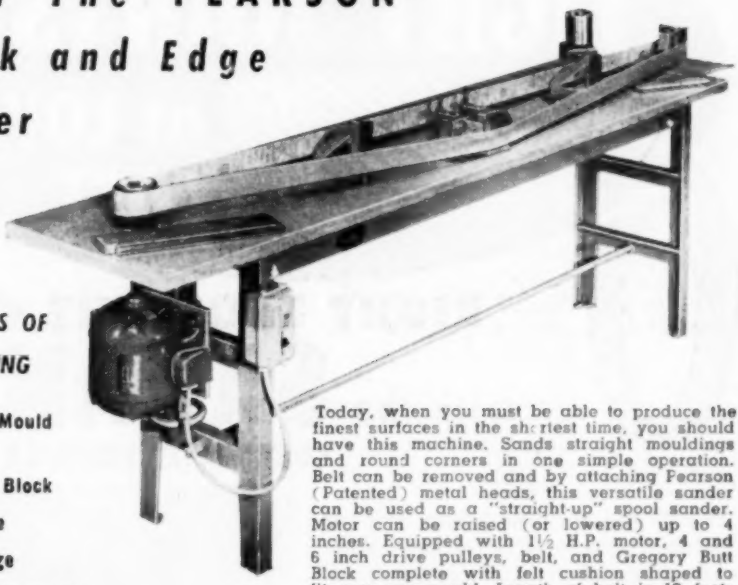
Personnel Control

Personnel no longer means simply hiring and firing workers. The field has broadened considerably to include human relationships and today is viewed as the art of suiting the worker to the job, and keeping him happy at his job, with the long view that a happy man will do better work for his company. Profit sharing, pensions, health and accident benefits, safety procedures, are all part of personnel control. This rapidly changing art of human relationships can best be learned by the small businessman by reading current literature in trade magazines and active participation in industry associations.

The Small Businessman's Position

A small business must perform all the functions of big business if it is to com-

Faster, Smoother Sanding With The PEARSON Block and Edge Sander



5 TYPES OF SANDING

Stationary Mould Block

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Curved Edge

Straight Edge

Spool (All types of curves)

Today, when you must be able to produce the finest surfaces in the shortest time, you should have this machine. Sands straight mouldings and round corners in one simple operation. Belt can be removed and by attaching Pearson (Patented) metal heads, this versatile sander can be used as a "straight-up" spool sander. Motor can be raised (or lowered) up to 4 inches. Equipped with 1½ H.P. motor, 4 and 6 inch drive pulleys, belt, and Gregory Butt Block complete with felt cushion shaped to fit any one mould. Length of belt is 19 feet; table 24 inches wide. Overall length is 11 feet.

We also manufacture Scroll and Drum Sanders

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HIGH POINT, N. C.

pete on an equal basis. To do so requires the most astute management and the exercise of ingenuity. The problem is half licked when the businessman realizes that because he is not familiar with a business practice, it does not mean that the practice is unimportant. The remainder of the problem demands constant recognition of the fact that in adopting proven big business methods to his scale, he must compromise with perfection and with the desire to do it entirely right or not at all.

Expert management is available to any plant, no matter how small its shoestring.

"I have never said hasty words I might regret later."

"So what does that make you?"

"A bachelor."

TIGHT JOINTS at LOW COST

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with the SARANAC

CORRUGATED FASTENER DRIVER

You'll get tighter joints with the Saranac Splicer at a fraction of the cost of hand driving. One operator can produce more than four men with hammers and pre-cut fasteners.

Fasteners are cut and driven direct from continuous coils of low cost ribbon stock. Stock costs 28% less than the equivalent amount of pre-cut fasteners. Splicer drives fasteners from 4 to 8 corrugations long — ¼ to ¾ inches wide — plain or saw edges. Fasteners driven flush or embedded in the board.

Seeing is believing! A new oak wood sample — showing the Saranac's surprising power and precision — is yours for the asking.

Write today for your Splicer Sample Block — and descriptive Bulletin 112A.

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Manufacturers of the World's Largest Line of Fastening Machinery

Know your wood

BALSA

BY JOHN KNOX

BALSA is the lightest in weight of commercial woods. It is widely distributed in tropical America from the West Indies to Bolivia. The sapwood, comprising most of the commercial timber, is whitish, oatmeal colored, yellowish or pinkish. The heartwood is brown or slightly tinged with red. The texture is uniform with a curious velvety "feel." The extreme lightness and softness of the wood is due to its thin cell walls and relatively large cell cavities.

Balsa wood varies considerably in weight, and its strength varies directly with its density. Slow growing trees and the inner portion of old trees tend to have denser wood; they approximate white pine in density. Balsa is not decay resistant and it is subject to sap stain. For many uses it must be treated to prevent moisture absorption.

The principal uses for balsa are for life saving equipment, floats, rafts, core stock, insulation, shipping containers, cushioning to prevent transmission of shocks and vibrations, sound modifiers, airplane models and novelties.

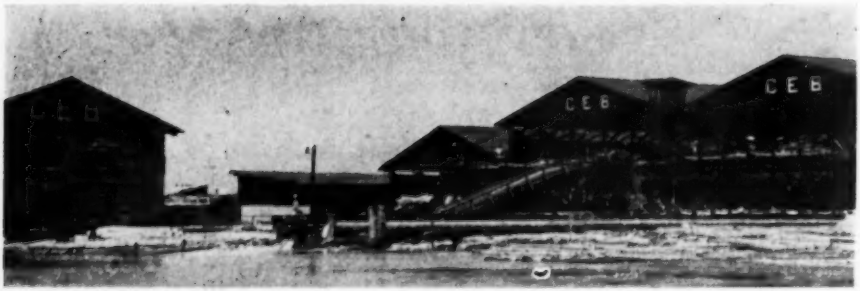
Mr. John J. Knox, vice-president of the Balsa Ecuador Lumber Corporation, New York, N. Y., has furnished us with the balance of this article which describes balsa and some of the products which are made from it.

The Development of Belcobalsa Core Stock

Balsa has always been associated with model airplanes, toys, life saving equipment and aircraft sandwich panels. Research work on balsa has been concentrated mostly on its production from the tropical forest where it originates and on its utilization in aircraft sandwich panels where it was and still is used to a great extent.

Seeing the very good results the aircraft factories were having with balsa cores, it was decided to adapt the principle to other industries which were using wood for core in the manufacture of their products. We thus began our sale of balsa as core material for use in solid core flush doors and furniture panels under the trade name of Belcobalsa. The aircraft factories were always careful in selecting their balsa according to a carefully worked out schedule of densities in order to obtain panels of even weights and performance. The principle of this method was followed when we started selecting lumber for use as core in the manufacture of doors and furniture panels.

The tree from which Belcobalsa is produced is a fast growing species (Balsa, Ochroma lagopus) which attains cutting maturity within six to seven years. At that age, it will give two 16' logs with a diameter of about 15". As a rule, a balsa log will give lumber of different densities. At its center, it will yield wood weighing, when dry as low as 1/3 lb. per board foot, while at the



General view of Balsa Ecuador Lumber Corporation's mill.

outer rim it will be as high as 1½ lb. per board foot. This difference in density and its influence on the utilization of the lumber in aircraft construction, obliged us to grade our output, not only for common defects such as are found in any hardwood, but also to grade for density. Because of this grading for density we have been able to select, as core material for the door and furniture industries, medium and uniform density stock, free of unsuitable light and soft textured wood, which gives the finished products an invaluable advantage of lightweight as compared to any other common domestic or tropical species used for the same purpose.

While promoting the uses of Belcobalsa as peacetime core material, we thought that the next most natural step was to supply a core more readily usable than standard lumber sizes and developed the idea and started to produce, what is now known and trademarked as "Certified Kilndried Belcobalsa Cut-to-size Core Stock."

Certified Kiln Dried Belcobalsa Core Stock

This core stock gives the door and furniture manufacturers a material which they could use with very little work at their plants. The time has now come where manufacturers or series goods receive their parts made to order. Their work consists of assembling these parts into the finished product. As an example, an automobile manufacturer would never think of making his electrical parts; they come to him ready to install from specialists in automobile electrical apparatus. The same trend is being followed by most industries, including our own—the woodworking industry. Some woodworkers still buy rough lumber which they dry, dress, and cut to their specific sizes, but a great many manufacturers who have gone into mass production methods receive their cut parts ready to assemble.

The manufacturer who furnishes these parts to specified sizes is a specialist in that work. His cost of production is thus lower than that of his buyer for the same work because he can keep his waste factor low, bearing in mind all his orders and different customer needs. He works out schedules for the most efficient output. His labor is also concentrated in the production of mass-produced small parts with high output, automatic machines. His buying of raw material, and kiln drying schedules, to mention only two other factors, are also focussed on the production of specialized items. In addition to all these, one must bear in mind that the waste which occurs in any event during manufacture, is kept at the source and is not shipped to the consumer, who in our case could be a furniture maker. This waste might

amount to 35% of the material going into the manufacture of cores.

The manufacturer who uses these parts has to worry only about his own production. He, too, has become a specialist and can cut his production costs. He saves on capital investment he would have to make or maintain for dry kilns and machinery to dry and cut lumber into core strips.

Before starting to produce our Belcobalsa core stock, we studied the methods used by many manufacturers in the preparation of core strip from regular size balsa. We found that by doing the same work at our planing mill we could do four things for the user.

1) Give him cut-to-size strips delivered in bundles with pieces of one dimension per bundle (same length, thickness and width).

2) Select Belcobalsa of one density to give the user the possibility of manufacturing light panels of even weight.

Lumber being loaded on barge for delivery to ocean vessel in harbor.

3) Eliminate high labor costs at the user's factory and integrate the cutting of these strips into our own production.

4) Eliminate unnecessary freight on waste material.

Balsa tree being felled.

Use of Certified Kiln Dried Belcobalsa Core Stock

One of the earliest utilizations of Belcobalsa was in the flush door industry. The fact that it is available ready to be assembled lends itself to the mass production of solid core doors, without the usual expensive plant layout required for the production of glued-up cores. Doors made with this core have the rigidity and solidity of the solid core type flush door, with the advantage of extreme lightweight.

Door stock is delivered cut ⅛" thicker than the finished thickness of the core, to enable the manufacturer to dress it down to the exact thickness of his frames. The lengths are selected to give the full core length; and the width, being delivered fixed, for example cut to 2¼", are ready for immediate edge gluing or dry assembly without premachining to exact width for butt jointing.

Some manufacturers produce a door with an edge glued core, while others prefer a more economical assembly called "dry-assembly" or sometimes "floating core." The latter is a very interesting process which completely eliminates the use of edge gluing equip-

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Wormy Chestnut	4/4
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NORTHERN STOCK

Birch	4/4 to 8/4
White Hard Maple	4/4 to 8/4
Hard Maple	4/4 to 12/4
Soft Elm	4/4 to 12/4
Basswood	4/4 to 8/4

SOUTHERN STOCK

Ash	4/4 to 12/4
Sap Gum	4/4 to 8/4
Tupelo Gum	4/4, 8/4
Red Gum	4/4
Hackberry	4/4, 5/4
Soft Maple	4/4 to 12/4
Poplar	4/4 to 12/4
Steamed Walnut	5/8 to 8/4

TRUCK BODY STOCK

Oak and Hickory S2S	4/4 to 8/4

IMPORTED STOCK

Honduras Mahogany	4/4 to 12/4
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ment. After Belcobalsa is planed to final thickness, the core strips are assembled dry, without being edge glued, in a jig to the length and width of the core and held together with perforated veneer tape. This facilitates handling and laying up at the press.

Once the plywood faces are glued to the frame and the core, all the component parts of the door are welded together into a rigid integrated structure which has all the strength and stability characteristic of structural aircraft sandwich panels made with Belcobalsa cores.

Similar types of assembly, either edge glued or dry, are also applied successfully to thick desk tops which are typical examples of such panels. The lightweight advantages of such tops (through the production line and in freight saving) are of great importance, added to the facts outlined on the characteristics of this cut-to-size core material.

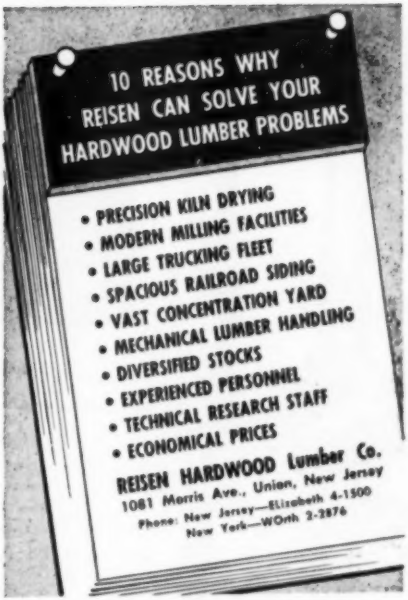
How to Work Certified Kiln Dried Belcobalsa Core Stock

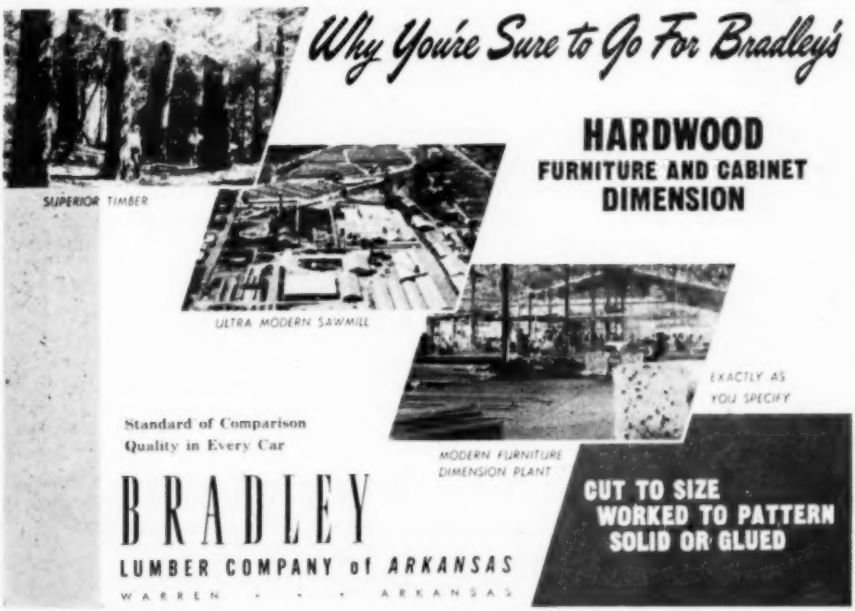
This article would not be complete without a word regarding the workability of Belcobalsa. On machining procedure, there is nothing to say as Belcobalsa is worked with regular woodworking machines. In our own plant we are equipped with American stock machines. We are always careful to keep our knives and blades sharp, which is, of course, natural.

As for gluing, because of its texture and low density, Belcobalsa is easy to glue to itself, to veneers, to plywood, to hardboards or to plastic sheets. It can be bonded with water-base adhesives used for gluing wood and requires only the usual handling as recommended by glue manufacturers. The bonds can be made by cold pressing, hot pressing or radio frequency heating equipment. Belcobalsa does not

require sanding prior to gluing; a careful planing is sufficient. For edge gluing, it can be glued as it comes off the ripsaw. Pressures to be used in the veneer press should not exceed 50 lbs. per square inch. An interesting feature, however, is that cold setting glues cure faster when used with Belcobalsa than with other woods, because the water of the mix is dispersed faster. This is caused by the anatomical characteristics of this species and its extremely regular growth features. Hot setting glue also cures faster because it takes less time to heat Belcobalsa for equivalent thicknesses than it does for heavier species. This last characteristic is due to the fact that light species have a high thermal diffusivity.

Your friends don't believe you make as much as you do, and the government doesn't believe you make as little.





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WOOD *Versus* Aluminum

By John Reno

THERE have been so many general statements made on this subject of wood vs. aluminum that maybe, as one great American once said, we should look at the record.

This article will deal with the subject as it relates to the heating of surfaces such as house siding, windows, brooder roofs, storm sash, screens and ventilated awnings when exposed to the sun and the effect therefrom on the temperature inside the building. It will also deal with winter heat loss.

Most of the data used in this article are contained in Building Materials and Structures Report BMS - 64, entitled "Solar Heating of Various Surfaces" which is a publication of the National Bureau of Standards of the U.S. Department of Commerce.

All authorities agree that a dark surface absorbs heat and becomes warm when exposed to the sun, so we will dismiss dark surfaces without further discussion at this time.

Various kinds of surfaces were exposed to the sun by the Bureau of Standards and their temperatures determined.

BMS-64 states that a surface covered with glossy white paint was cooler than any other tried. One covered with flat white paint was nearly as cool.

This report also states that a surface covered with aluminum foil was cooler in the sun than another covered with aluminum paint. But both were considerably warmer than the white painted surfaces!

It is reasonable to believe, as is assumed in BMS-64, that the tendency of an exterior covering to impart heat to a house is increased as its temperature increases.

Finally, BMS-64 states that the best protection against heat from the sun would be a white painted surface—for instance, wood siding, shutters, awnings, farm buildings, etc.

The report concludes that oxidation of the aluminum and soiling of the painted surfaces would reduce their insulation effectiveness to some extent.

Most aluminum siding is pre-coated or painted on the outside surface. This immediately changes the reflective property of the siding from the value of aluminum to that of whatever color

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Mr. Reno is utilization director of the Pacific Lumber Company.

of coating is used, and seldom is that color white—that best of all reflectors. The air space adjacent to the inner face of the aluminum is so narrow, with one edge of each piece of aluminum actually touching the sheathing, that probably this face has little if any reflective worth.

The above information has to do with radiant heat from the sun which is the category in which it was previously supposed that aluminum was better as a protection against summer sun.

When it comes to heat conduction, wood—painted or unpainted—is so far superior to aluminum as an insulator that it is positively amazing.

Figures in the Refrigerating Data Book of the American Society of Refrigerating Engineers show that, in a given length of time, aluminum of a given thickness and area will transmit almost two thousand times as much heat as will a piece of wood of the same dimension. This means hot sun heat into the house or other building in the summer and expensive furnace heat out of the house in the winter.

Is it any wonder that those with windows of aluminum (or, for that matter, any metal) cannot sit within several feet of them on a cold winter day without feeling the full force of Jack Frost's attack?

Just touch the different materials with your fingers, even in Tampa, Florida, and you will understand why the area around the aluminum window is so uncomfortably cold in the winter. These cold surfaces create drafts. We even lose at least a small amount of our body heat to them by radiation, thus adding to our discomfort. This is noticeable when sitting near that best of all metal windows—those in railroad diners and Pullman cars. These are metal because of structural reasons.

Unfortunately this condition is made worse by infiltration around the edges of metal windows and storm sash due to the contraction of the metal because of low temperatures. Aluminum is worse than steel in this respect as it shrinks twice as much as steel. To aggravate the condition still more, the aluminum and steel shrink in the winter when we would like them to swell to make a tight joint and then expand in the summer, causing sticking when we would prefer a little looseness. Investigation by the Pittsburgh Testing Laboratory disclosed that, when placed over the same window, a make of wood storm sash marketed in large quantities throughout the nation was more than five times as effective in preventing cold air infiltration as the best of the aluminum storm sash and those made of other metals. This well known testing laboratory exercised its usual meticulous care to be impartial and objective in its investigation.

When it comes to keeping heat from the sun out in the summer and heat from the furnace in during the cold months, the above data confirm actual experience that wood is by far the best answer—and it looks better too.

As for the expense of painting windows, siding, etc.—well, we paint wood only because we believe that it gives wood a nicer appearance. Not many people will say that unpainted aluminum looks very nice several years after installation; and few people enjoy the condensation which is frequently experienced during the winter months on the interiors of metal windows.

When it comes to long life, siding and other products made of the heartwood of redwood, cedar and tidewater red cypress last indefinitely long, even in the face of any attack from the elements, fungus or insects, as do properly treated wood products of other species.

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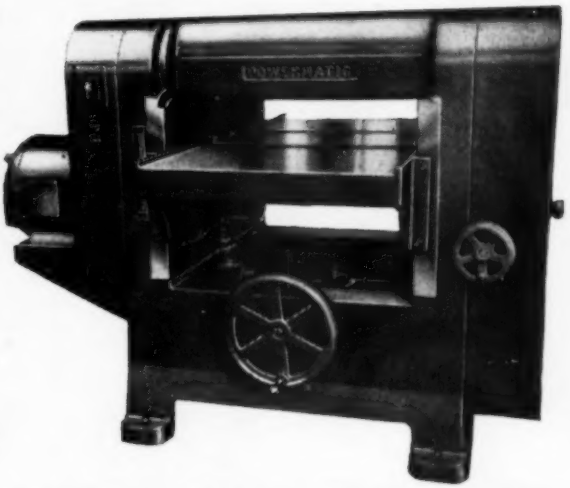

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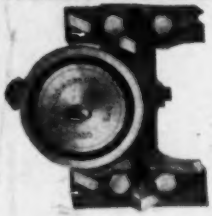
TOOL UP WITH WOODWORKERS'



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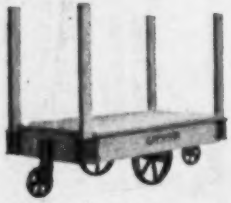

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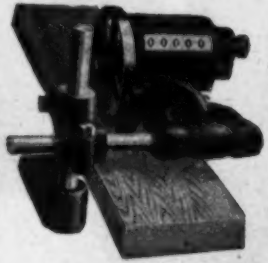

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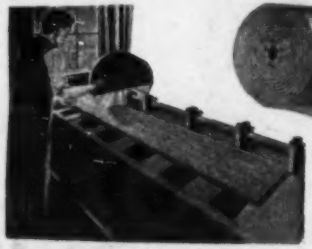

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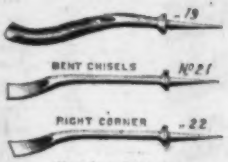

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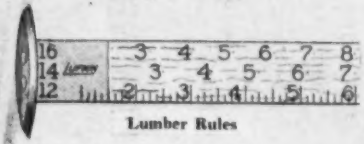

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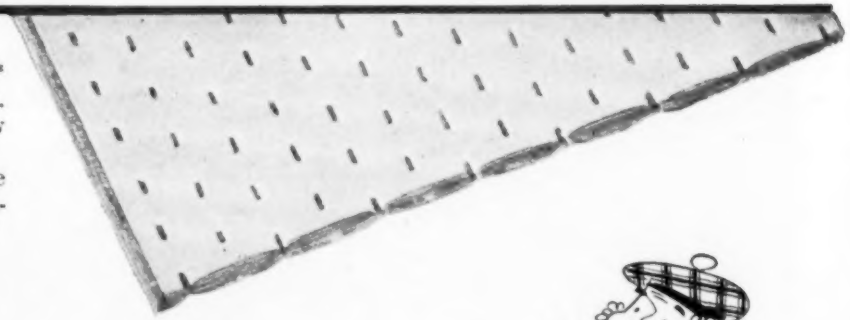

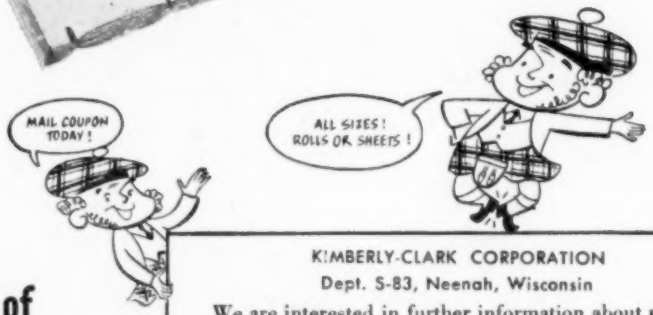

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Quality Finish Sells WALNUT FURNITURE

By H. H. Connelly

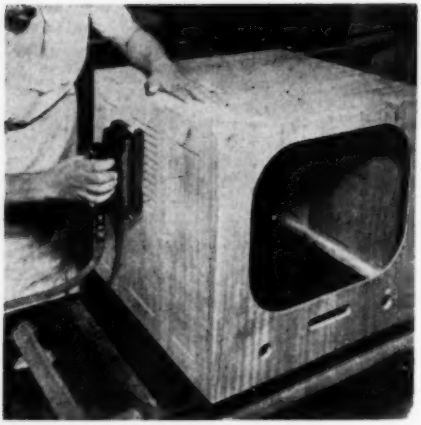
WE can apply a finish to sell cheaper than we can apply one that will both beautify and protect. What is the best finish for walnut—our finest and oldest furniture wood—measured by today's standards, that will perform this dual function of preserving and beautifying? Here are the steps as used and tested by some of the finest furniture makers in the country. They all agree that good finishing starts long before the product comes into the finishing room for work there.

About all our finishing can hope to do is provide some sort of impediment at the cellular doors where the moisture tries to enter. If our finish is good, we can slow down the process to a snail's pace; given time enough, it will enter and do severe damage. Happily these periods of high humidity don't stay as long as our visiting relatives. Before our finish film has let much in, it meets itself on the way out.

Now suppose our wood was dried to within 2% or 3% moisture content. Fine you say? No moisture to worry with? To finish a piece of solid walnut furniture this low in moisture content is like sealing up a powerful vacuum. As soon as a high outside moisture prevails, the thirsty pores will soak up the water like a sponge. The sad part is that it will never lose as much moisture as it has taken on. When you once had a perfectly fitted drop leaf table, you now have a swelled hinge seat, a bad fit and an angry customer.

The proper moisture content for furniture varies slightly by section; but a safe point of equilibrium is not far from 9% to 10%.

With walnut this fact is more important than on more stable woods less



Operator is sanding a wash coat on a TV cabinet.

subject to change by moisture penetration. It is helpful to remember that there is greater damage to furniture made from wide boards than a piece constructed from narrow boards glued into wide pieces.

One firm making solid furniture turns every other piece end from end. When glued up, they have a wide board composed of many narrow pieces which gives opposing stresses by reversing the grain pattern.

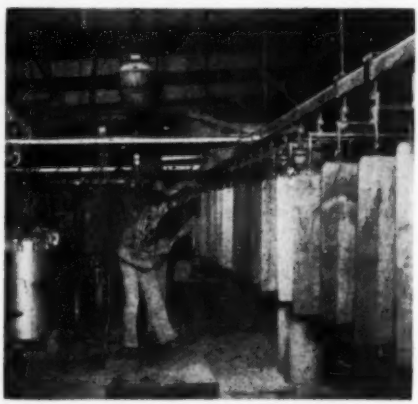
In finishing walnut veneered furniture you will experience a number of problems not encountered in finishing solid. There is the problem of selecting quality veneers that are cut sufficiently tight to provide good faces when figure matched. The moisture content of walnut veneered panels will definitely point the way for trouble. If too much moisture is present, poor sanding results, poor staining and filling consequently follow.

The face veneers of walnut panels should not exceed 10% for best results. If higher, a fuzzing of the fibers follows the sanding. Excess stain is sucked up by the wick-like fibers standing on end and the filler clings like paste, refusing to be removed.

Recommended Sanding For Best Walnut Finishing

Manufacturers of good walnut finishing are not all in agreement as to just what type of machine, grit and order of sanding is best. For instance some factories insist drum sanding should come first, followed by one stroke polishing operation. Others specify only two stroke sandings with drum sanding taboo. You can find as many varied opinions on what grit size to use as there are sandpaper salesmen.

But here is one point all are in agreement: the final sanding should leave the work well polished, free of raised grain, sanding marks and cross grain scratches. After observing for a number of years the methods used by many fine furniture finishing companies to accomplish the above goal, we would be quick to suspect that the different methods employed are not used because one is superior to the other, but be-



Applying filler to walnut panels on a fast moving, overhead conveyor. Sufficient drying time is allowed between spraying and padding to permit the filler to flash. A rotary padding machine and cleaning up with waste follows.

Applying lacquer to a walnut radio cabinet. In order to obtain maximum production without sacrificing quality, a minimum of 2½ to 3 mils of lacquer should be applied, either in one booth or several depending upon the conveyor speed.

cause of available machinery, its location and degree of skilled help.

There is, however, this common practice found in all good plants turning out a quality product. A part is sanded progressively on machines with each operation employing a finer grit than the preceding machine.

An example of this was found in a desk factory a short time ago. Walnut desk tops were first sanded on a four drum sander covered in this order: the first drum had 1/2-60 paper, the second 1/0, the third 2/0 and the fourth 3/0. Following the drum sanding the tops were stroke polished with a 4/0 paper belt. At no time did the top receive subsequent sanding with a grit equal to or coarser than that used for the preceeding sanding.

Following the final machine sanding with 4/0 paper, the desks were given a hand sanding with 5/0 paper just prior to going on the finishing line.

The advantages voiced here are that the wood fibers have been raised slightly by atmospheric moisture when allowed to stand for any length of time after machine sanding. These raised fibers tend to pull out during the filling operation.

Here is another superb trick used by one firm to insure good final sanding for finishing and at the same time combine a glue sizing operation often confined to the finishing department. Two felt covered rollers are mounted directly behind the drum sander: one above and one below the table. The felt is kept saturated with hide glue solution, which is deposited on the sanded surfaces as the work passes from the drum sander. The coated stock is stacked on one-half inch stacking sticks for drying in a heated room. To insure that the polishing sander does a thorough job in removing all the glue, a brown dye is added to the glue size. When this has been completely sanded away leaving the new wood, little doubt is raised as to the job being a thorough one.

Sap Stain

For years, furniture manufacturers shunned the sapwood that developed in walnut veneer. This was primarily because the practice of staining the sap to harmonize with the heartwood was a cumbersome and expensive hand operation. That and the fact that the de-

Rubbing the final finish to cut down to a smooth surface free from all irregularities.

velopment of a satisfactory stain was hard to find.

With the growing scarcity of walnut, resulting in higher material prices, the practice of utilizing the sapwood became more common. Poor water stains were replaced by non-grain raising stains that could be applied quickly by hand or spray gun, and so skillfully it is impossible to detect the sap from the heart when finished.

This stain can be secured from finishing material supply houses in either non-grain raising or water stain. You will find the former to be more expensive but highly satisfactory as the problem of raised grain is deleted entirely from the finishing schedule.

To apply the stain by hand, a wedge pointed felt is best. Dip the felt in stain and work with the grain in long even strokes. Care should be taken to follow the pattern of the grain and not leave abrupt breaks in the staining strokes. These show up through the finish as obvious errors. Sanding is the only method practical in removing stain once it has been applied.

Sap staining can also be done skillfully by spray gun. A small spray gun that can be adjusted to spray a round narrow pattern is the best type.

One concern is using this method for sap staining walnut panels on a continuously moving conveyor line with a high degree of skill. However, with a spray gun, until the operator has developed the proper technique, there is more danger of understaining than overstaining. The spray pattern should be adjusted to cover the width of the sap streak only; and not lap heavily onto the heartwood. The small feathering that a properly adjusted spray pattern provides will beautifully blend the different colored woods.

One excellent walnut finishing schedule recommended for a quality line of furniture is: (1) stain, (2) wash coat, (3) fill, (4) seal, (5) topcoat, (6) rub and (7) wax and polish.

Many finishing schedules omit the wash coat operation. However, the improvement made by wash coating is quite noticeable. A wash coat not only seals the highly absorbative pores preventing uneven filler staining, but actually improves the surface of the walnut to the point where filling time can be materially reduced.

You will find that when using a filler stain combination, less stain is absorbed by the wash coated surface. Therefore a tinted wash coat is recommended to help overcome this difficulty.

Follow the wash coat with a scuff sanding. If you make your wash coat from lacquer sealer and thinner, 10 to 15 minutes of drying should be ample. Use a 7 or 8/0 finishing paper when scuff sanding is to be done.

Filling is an important function of quality walnut finishing and as such demands the best in filler formulation. Today, modern fillers should be formulated in keeping with improved finishes

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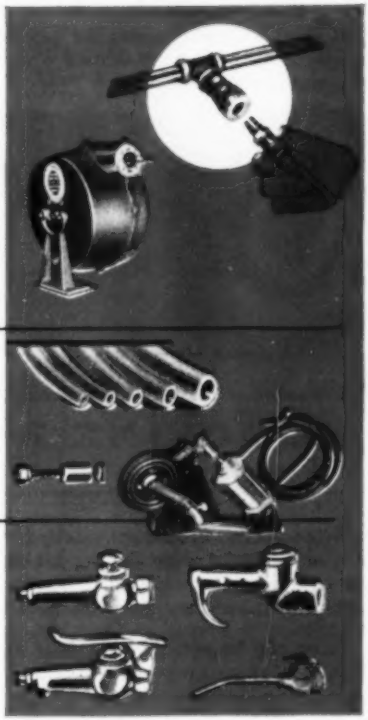

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such as alkyd, urea formaldehyde and lacquer. Heavy slow drying oil fillers are a hinderance to good finishing practices and should not be used.

Filler can be applied to walnut either by brush or spray gun. For gun application, an adjustment needs to be made in the viscosity or difficulty will be experienced with the spray gun.

Two helpful suggestions for good filling: (1) allow the filler to completely flash before wiping and (2) pad the filler into the pores of the wood.

Filler padding can be done by machine. One method is to use a circular felt padding machine. A second method is to pad across the grain only with a reciprocating air or electric machine.

Good drying is important after filling. Time of drying will depend upon the humidity and temperature unless drying ovens are used.

Sealing

Sealing in finishing of walnut deserves careful consideration. Here we are selecting and applying a material that will harmfully effect the final product if not used carefully.

First consider your top coat. The sealer should be recommended as compatible by your material supplier.

If you are varnishing, you can use lacquer sealer. If using lacquer, by all means use lacquer sealer.

Here are the good properties you should look for in a sealer coat: (1) sands well, (2) quick drying to minimize the finishing schedule, (3) compatible to the top coat, (4) compatible to the filler.

Here is a simple test you can conduct in your finishing room to determine whether a sealer meets the third and fourth requirements.

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Process a walnut panel, selected from your regular run, through the operations of filling and allow to dry. With one half of the panel masked, seal the other half with the material in question and the other half with a good sealer.

When the material has dried, sand and apply the top coat to the entire panel. A simple scratch test will tell whether the sealer is equal to or poorer than the approved sealer.

In regard to the first requirement, sanding property, it is well to mention that this characteristic is imparted to lacquer sealer by metallic soaps which also have the bad trait of making the finish brittle and less resistant to checking.

This danger is more acute with a heavy film. For this reason, a film thickness from ½ to 1 mil is strongly recommended. A part of this thickness should be removed by sanding.

One finishing material manufacturer, aware of this danger has worked out a method of applying the sanding aid to the sandpaper instead of the lacquer. With this arrangement it is possible to spray the first coat with regular high solids lacquer, applying as thick as desired without the danger of cold checking. The sanding is not so difficult with the special sandpaper. However, you will find with regular abrasives, that the lacquer tends to roll under the sanding block, resulting in unsightly scratches and blemishes.

Lacquer sealers are secured ready for using—usually 21% solid. Do not thin further for best results. Apply with a spray gun using a tank pressure of 5 to 10 p.s.i. and a gun pressure of 45 p.s.i.

After two hours, your walnut furniture is ready to sand. Use a felt block and 6/0 finishing paper on flat surfaces. Steel wool is best for moldings

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Figure 1011—Balance style for turning sharp corners. Variety of superstructures and wheel sizes.

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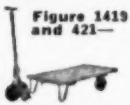

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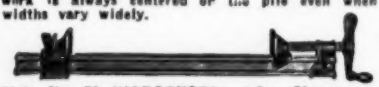

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and always work with the grain.

In sanding, care should be taken not to go through the sealer coat. Spots that are sanded through should be touched up with burnt umber and vinegar mixed to a brown paste. A hard felt is excellent for applying.

Top Coat

Two coats of lacquer are considered sufficient for good walnut finishing. However, the number of coats is no criterion of the film thickness. Some spray operators are able to apply as much material in one spray application as others are able to do in two passes. The final thickness of the film is your measuring stick for good finishing, and for a quality finish of high polish from 2½ to 3 mils are necessary to obtain the building properties or apparent depth required for an outstanding walnut finish.

A part of this build is due to the solid content of the lacquer. An example is lacquer containing a high percentage of gum resin. Such a lacquer will permit a high gloss film having the appearance of great depth.

The new lacquers containing the miracle silicones accomplish the same results with undreamed ease. Thinner films cause excessive rub-through in polishing; thicker films are wasteful and lead to dangers of cold checking. A frequent check of film thickness by the foil test is advisable.

In spraying, 40 to 45 p.s.i. gun pressure is sufficient to completely atomize lacquer, while a tank pressure up to 15 p.s.i. may be necessary to force the material to the gun.

If three passes are necessary to build the film thickness, you will reap better results by cross coating the second. Then the first and last coats are sprayed with the grain.

Care should be taken to prevent sags during this operation. If feasible, allow

at least a five minute drying period between coats—more if possible.

Your lacquer comes in drums of applying consistency. Never thin to spray. This is false economy. Thinner is volatile and rapidly evaporates leaving the solids—the film you are trying to build.

No sanding is necessary between lacquer coats and an overnight drying is recommended before rubbing and polishing. If sanding is necessary, this should be done with wet-or-dry sandpaper of 320 or 360 grit. Naphtha can be used as a lubricant.

Summary

A summary of the important steps necessary in obtaining a beautiful finish for walnut are as follows:

(1) Season the wood carefully in the white.

(2) Sand to a good polish using progressively finer grits of paper.

(3) Sap stain and wash coat using N.G.R. stain and lacquer sealer cut 3 to 1. Sand.

(4) Fill and sand.

(5) Seal and sand.

(6) Apply 2½ or 3 mils of top film.

(1) Rub and polish.

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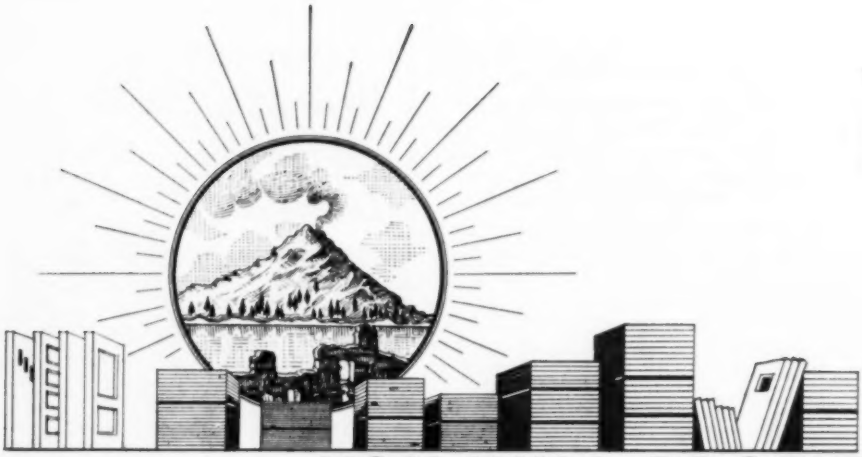

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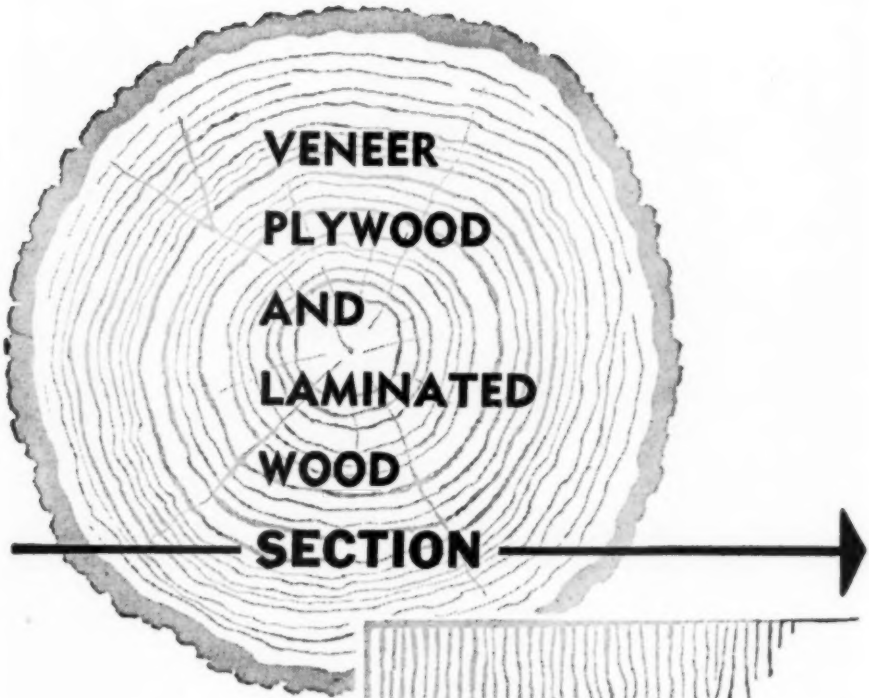

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Veneer Jointers

By Thomas D. Perry

THE veneer clippers, described in Part 4 of this series (June, 1953 issue), serve to cut the veneers to dimension, allowing for a reasonable trim waste in the completed plywood. Most of this clipping is double—once on the green veneer before drying, and again after drying to remove the defects developed during drying. There is a tendency among the more progressive veneer mills to dry before the initial clipping, in which case only one trip through the clipper is required, since it can serve to eliminate both natural defects in the wood, as well as those that may occur in the drier.

Required Waste Allowances for Clipping and Jointing Veneer

The customary minimum waste allowance for clipping dried veneer is 1" to 2" in width, the smaller allowance being for dimension plywood, to be made into furniture and similar products, and the larger figure being applicable to larger stock panels, from 36" x 60" and up. This is considered to be enough to permit two joints per sheet of veneer, or six edge jointings of 1/32" to 1/16" each on three pieces a veneer per layer.

Waste allowances on green veneers are quite another matter, since there is a normal shrinkage of 5% in width, between green veneer (30% m.c. at saturation point) and dry veneer at 5% to 10% m.c. This means a widthwise dimensional loss of approximately 2½" in a 48" stock panel. In addition, veneer with pronounced angling grain, tends to distort and dry in slightly diamond shapes, causing further waste. Allowance must also be made for possible losses in dry clipping, in jointing and in the final trimming of the plywood. When all factors are added up, the safe allowance for waste in the double clipping of green veneer amounts to 13% and 15% of the final net trimmed width of the plywood, or 5% to 6% of the net for waste in the single clipping of dry veneer.

The actual requirements of all these factors are summarized in Table 1, for widths between 24" and 48". The totals may be a bit astonishing, but they must be faced as facts, and they are an important element in the cost of plywood. Obviously, allowing "plenty" of waste allowance is not justifiable, and every factory should set up a standard allowance for its regular types of work.

Clipping Compared With Jointing

The operations of clipping leave somewhat roughened edges, which are likely to be more or less splintered. These may be satisfactory for plywood

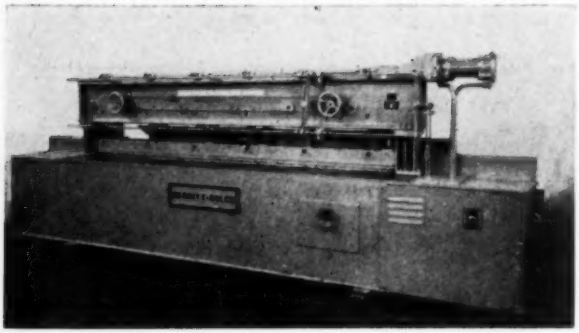

Fig. 1. Front view of Merritt-Solem veneer jointer.

backs, or for inner plywood layers, where thick faces (1/8" to 1/10") are customary, as in many grades and types of softwood plywood. However, a clipped edge in veneer is not suitable for use in a tapeless splicer, nor for splicing with gummed tape. The rough clipped edge must be made perfectly straight, smooth and square, so that the joints in the plywood will be snug and tight. This should apply whether taped or glued edge to edge.

Fundamentals of Jointing Veneer

Veneers are jointed in packs or bundles, 1" to 4" thick, which are firmly clamped together during the entire cutting cycle. These packs are jogged to as even an edge as possible before putting in the clamp, so that any jointer waste is kept at a minimum. After one edge has been jointed and the clamp pressure released, the pack is jogged to the other edge, again clamped, and run through the jointer a second time. This takes care of random width stock and gives excellent economy.

Some jointers have two revolving cutter heads, one making a heavy roughing cut, followed by a very thin finishing cut. Others find that a single medium cut meets a large percentage of conditions, and that an occasional extra "run-through" is more economical than the double cut.

Most jointers are now equipped with a glue spreading roller, to apply the resin adhesive, required for tapeless splicing, immediately after the final cut and before clamp pressure is released. On the other hand, some operators prefer to use the glue applicator roller which is built into the tapeless splicer.

Types of Veneer Jointers

There are three general types of ve-

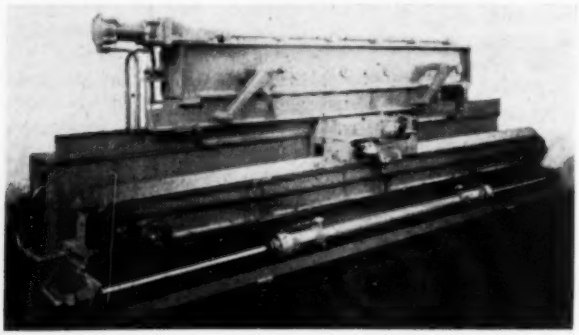

Fig. 2. Back view of Merritt-Solem veneer jointer.

Table. 1. Waste Allowances for Veneer Widths

Net Width of Plywood	Segregated by Manufacturing Operations						
	Shrinkage on Green Veneer, 5%	Distortion During Drying 2%	Re-clipping Dry Veneer, 2 Joints or 6 Edges	Jointing, Averaging 1/16" on 6 Edges	Plywood Trimming, Both Edges	Total Maximum from Green Veneer, Double Clipping	Total Maximum from Dry Veneer, Single Clipping
24"	1.2"	.48"	.6"	.4"	1.0"	3.68"	1.40"
30"	1.5"	.60"	.6"	.4"	1.25"	4.35"	1.65"
36"	1.8"	.72"	.6"	.4"	1.50"	5.02"	1.90"
42"	2.1"	.84"	.6"	.4"	1.75"	5.69"	2.15"
48"	2.4"	.96"	.6"	.4"	2.00"	6.36"	2.40"

Maxima in right columns are subject to adjustment for more or less joints per veneer layer, as well as for straightness of grain.

neer jointers, differing considerably in detail, as will be pointed out and illustrated:

1. Traveling and revolving cutter heads with veneer pack in stationary clamps. Cutter heads travel back and forth on ways.

2. Stationary revolving cutter heads with veneer pack traveling between caterpillar type clamp chains.

3. Drop knife with shearing cut. Used for jointing fancy face veneers and geometric (angle) matching. Strictly speaking, this type is an adapted paper cutter, with a drop knife which moves in slanting ways.

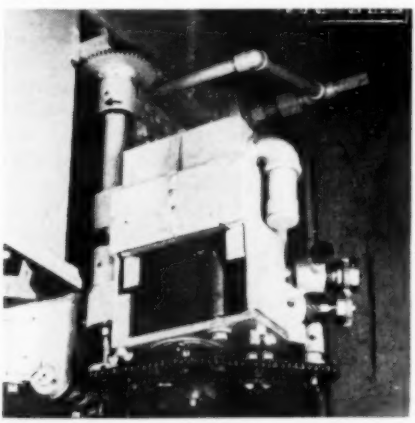

Fig. 3. Gluing mechanism in Merritt-Solem veneer jointer.

As a general principle, rotary cutter heads, usually with eight knives, do their smoothest cutting on relatively straight grained veneer. Many types of veneer can be successfully jointed with rotary cutters, but as the angle of the grain increases, rough cutting is likely to occur, until the point is reached where shear cutting becomes necessary.

As a usual rule, the cutter runs against the feed, although there are exceptions.

Traveling Cutter Head Jointers With Stationary Pack of Veneer

A widely used standard machine of this type is illustrated in Figs. 1 and 2, front and rear respectively. In the front view (Fig. 1) can be noted the heavy welded steel base, or bed section, the top of which serves as a feed table to unload the machine. Immediately above this feed table is the clamp bar, with a 6" width of bearing face, actuated by four hydraulic pistons in the head, which in turn is supported at each end by rugged columns. Standard machine sizes provide for maximum veneer

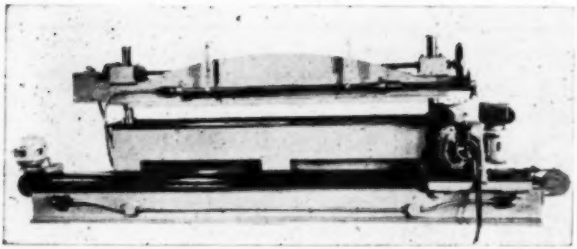

Fig. 4. Back view of Mereen-Johnson veneer jointer.

lengths of 90", 102", 126", 150" and 197". The extensions of the base, beyond the working table, accommodate the hydraulic devices, and provide clearances for the carriage to travel beyond the cutting zone, at each end.

The hand wheels, in front of the head, provide for adjusting the continuous back gauge bar, which controls the depth of the cut. Packs of veneer are jogged to one edge, and carefully pushed against this back gauge bar during loading. While the carriage travels on the cutting and return cycle, this gauge bar is automatically raised up and away from operating position, by rollers at the front and also rear of the cutter carriage.

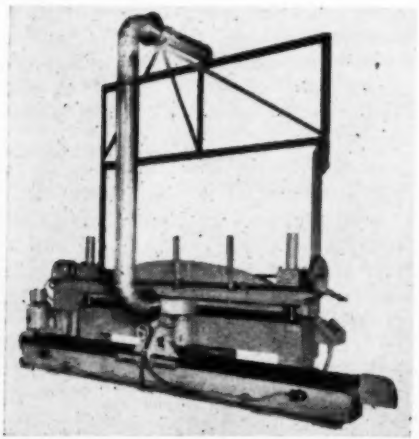

Fig. 5. Rear view of Mereen-Johnson veneer jointer. Photo shows complete dust removal hood, piping and supporting frame.

The rear view of the same machine is illustrated in Fig 2, in which the cutter carriage is in mid-position, and the gauge bar, hung from angling links, is raised clear of the cutter carriage. One of the significant features of this machine is the hydraulic drive for the traveling cutter carriage. This provides unusual flexibility in speed control, from 10 to 75 feet per minute on the cutting stroke, according to the requirements of the cut, and 75 feet per minute on the return stroke. This hydraulic mechanism is shown in the lower forefront of Fig. 2, and consists of a cylinder moving back and forth from a central piston. This reciprocating cylinder motion is transmitted to the cutting carriage by endless sprocket chains. These are provided with ample tension adjustments.

There are two cutter heads, mounted on vertical motor shafts, one for the roughing cut and the other for the thin finishing cut. With a 2" wide cutter head, the maximum thickness of the pack of veneer must not exceed 1⅞" when clamped tight, and the maximum opening of the hydraulic clamp is set at 4". When the cutter heads have a 3¼" face, the permissible cut is 3" and the clamp opening 6".

The cutter head carriage is also provided with a glue spreading device to apply the proper resin adhesive to the edges of the veneer pack while still under clamp pressure. Details of this gluing mechanism, which follows the finishing cutter head, are indicated in

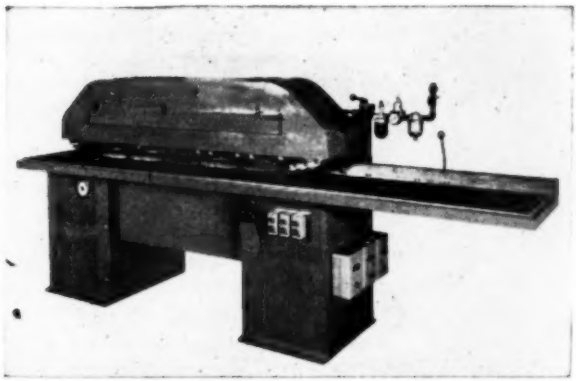

Fig. 6. Outside front view of continuous feed veneer jointer.

Courtesy Veneer Machinery Company.

Fig. 3. The rubber faced glue roller, on a vertical shaft, does not dip into the glue reservoir below, but is supplied with glue by a dipping disc, which is mounted on a horizontal axis and rubs against the face of the rubber glue roller. Doctor rolls are provided to regulate the spread of the glue, since too liberal an application is likely to be squeezed out of the joint on the tapeless splicer, and may cause trouble in subsequent plywood gluing.

The cutter head carriage travels on a broad "V" way, accurately machined and equipped with automatic lubrication and dust wipers. This insures a minimum of wear over many years of service and makes practicable smooth straight line travel in both directions at any speed. The entire cutter carriage is automatically off set on the return stroke, to clear the pack of veneer in the clamp, and the pressure is similarly released after the return stroke is completed.

Another type of traveling head jointer is shown in Fig. 4, which is entirely operated by electric motors, without

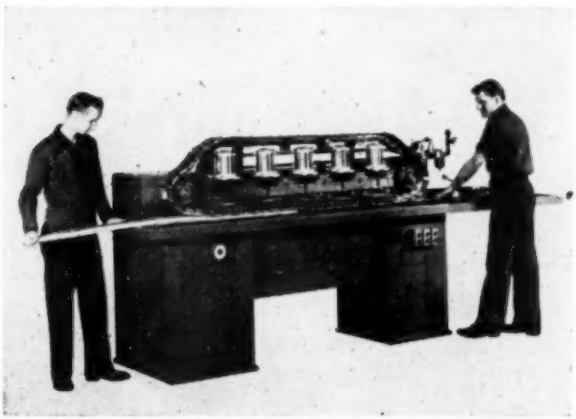

Fig. 7. Continuous feed jointer with hood removed.

Courtesy Veneer Machinery Company.

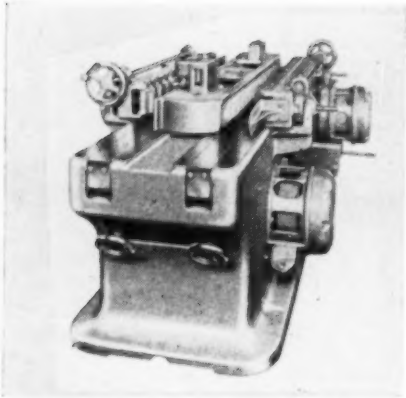

Fig. 8. End view of Diehl veneer jointer.

hydraulic devices. The back gauge, for regulating the depth of the cut, is much lighter in weight and consists of two or more rods on a shaft, which swing up against the back of the head during the cutting and return stroke of the cutter carriage. An automatic switch prevents any movement by the carriage except when the back gauge is swung up.

The clamp pressure in the pack of veneer is exerted by means of upright stationary screws, equipped with electrically driven nuts, providing a clamping and unclamping speed of some 50 feet per minute. This machine differs from the type described above (in which the head was stationary), as the entire head now becomes the top member of the clamp, and is raised and lowered by the clamp screws.

The endless sprocket chain, which moves the traveling cutter carriage, is driven by an independent electric motor, through worm or spiral gears, and provides for cutting travel at the rate of 30 feet per minute, and for the return stroke at 60 feet per minute.

The cutter carriage travels on a "V" way, well lubricated and protected from dust, and provided with adjustable gibs to compensate for wear. The two cutter heads, with individual electric drive, have 4-knife heads, but the first (roughing) can be tilted to accommodate a small circular saw, which some operators prefer for the roughing cut.

The standard sizes of this machine accommodate veneer lengths of 90″, 102″, 126″, 150″, 200″ and 212″.

Optional attachments may be had for glue application (on the traveling cutter carriage); for a mechanical loader, mounted on the rear of the jointer; and for complete dust removal piping, provided with swing joint and telescopic sections, to accommodate the recipro-

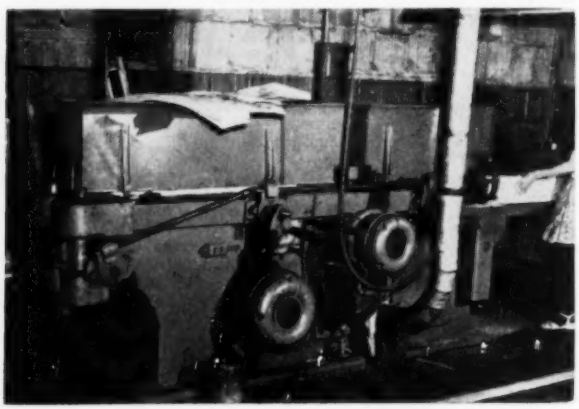

Fig. 9. Side view of Diehl veneer jointer equipped with side guides for wide veneer.

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Fig. 10. Feeding wide veneer into a Diehl veneer jointer.

cating travel of the cutter carriage. This dust hood connection and supporting framework are seen in Fig. 5.

Stationary (but revolving) Cutter Head Jointers, With Traveling Pack of Veneer

This type of machine presents an approach to veneer jointing which is quite different from the principles employed in the machines which we have already described.

The two cutter heads are motor driven and mounted in the head frame at the rear of the feed table. This feed table is recessed for the lower endless chain feed belt, the top face of which travels flush with the top of the feed table, the return section running below in the base or main frame. An outside front view is shown in Fig. 6.

The upper endless feed chain belt is mounted in a hood attached to the head of the machine and travels under a series of five slightly rocking pads, which bear down on the inner side of the links of the chain. These links are 6" wide by 2½" long. Each pad is pushed down against the chain by an individual pneumatic cylinder, which can be adjusted to any cushion effect desired. The details of the construction and operation of the upper chain are shown in Fig. 7, with the protective side hood removed. The veneer is fed against a side fence, or back gauge, and is pressed down firmly, by the successive pneumatic cylinders as it travels through the cutting zone. This speed of travel can be varied between 15 and 45 feet per minute, according to the character of the veneer.

In this machine the roughing cutter head runs with the travel of the veneer, while the finishing cutter head, removing the final 1/32", operates against the travel of the veneer. It is

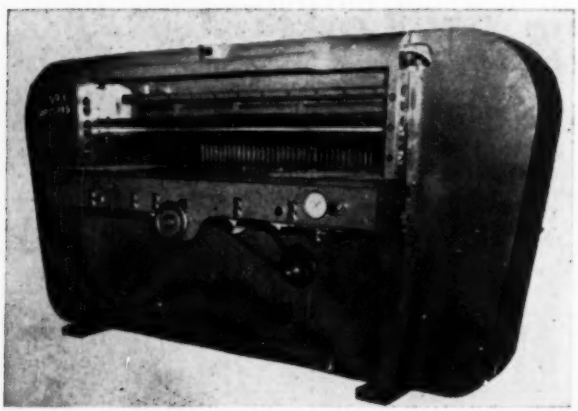

Fig. 11. Francis hydraulic precision veneer cutter. The machine is available in three sizes: 60", 75" and 90" length of cut.

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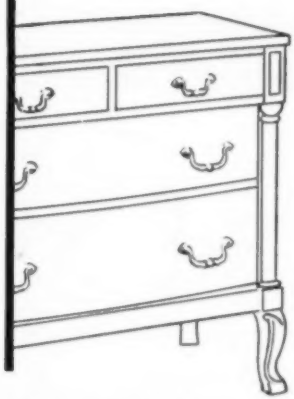

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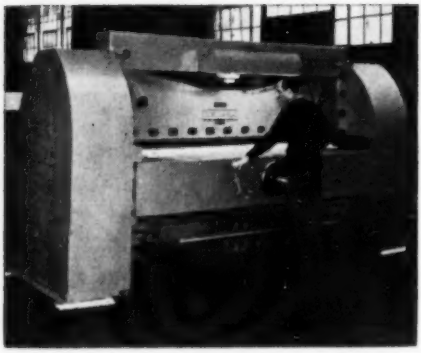

Fig. 12. Columbia hydraulic veneer cutter and jointer. Available in three sizes: 66", 78" and 100" length of cut.

claimed that this cutting technique will successfully joint burls, crotches, swirls and all highly figured face veneers. The cushioning effect of the pneumatically operated pads gives excellent results on buckled veneer. The operating range of the pneumatic cylinders provides satisfactory clamping, either on a full pack, or in a pack of one quarter of the maximum thickness.

It is to be noted that only one standard size of machine is required, since there is no limit to the length of veneer that can be jointed. The feed chains run true, in properly designed ways, and veneer 2 feet or 16 feet long will have equally straight and square edges, producing tight, snug joints.

A glue applicator roll is an optional feature, located just beyond the finishing cutter head, and under the protective hood.

Another type of stationary head jointer is shown in Fig. 8, which differs from the previously described machine in the way the veneer is fed into the machine. It is the only jointer, of all those mentioned in this article, in which

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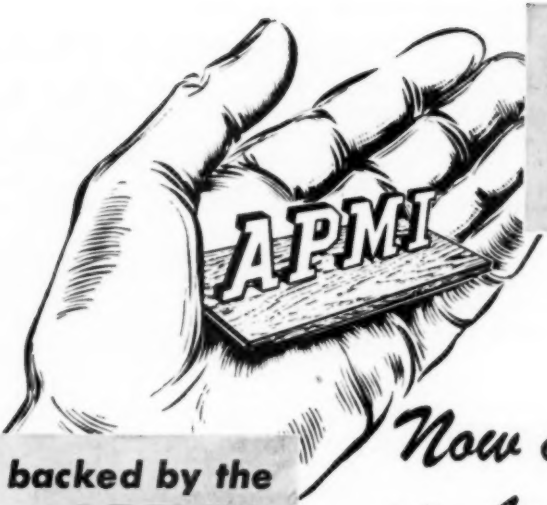

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the pack is fed into the machine with the edges of the veneer down against the work table, just as it is jogged. Obviously this saves the time of turning the pack into a horizontal position, with more or less shifting of the veneers in the turning.

The 8-knife cutter heads, with horizontal shafts, are located in the base of the machine, and also the glue applicator mechanism, the use of which is optional. There is a central frame head, equipped with an endless caterpillar type chain, mounted on vertical shafts. Packs of veneer travel through the machine twice, down on one face of this central chain and back on the other, or return side, with separate cutter heads for each direction of travel. The face of this chain, some 4" wide, is studded with small pyramids, that grip the wood firmly and can be sharpened as required.

The pressure is exerted by two series of 13 pressure rollers on vertical axes, which are 2½" diameter, 4" long and spaced 4" apart. Each roller is held against the chain and the veneer by spring pressure equivalent to 80 lb. p.s.i. This provides a firm clamp and insures straight line travel, so that veneer edges are uniformly square and true. The use of these idling pressure rollers eliminates the problems of synchronizing supplementary feed chains, under varying work requirements.

Operating speeds are 33, 50, 67 or 100 feet per minute, and the average thickness of the veneer pack is 2", with a maximum of 4½" and a minimum of approximately ½".

The side view of Fig. 9 shows high side fences added to facilitate the handling of wide veneer. For the practical use of these fences see Fig. 10.

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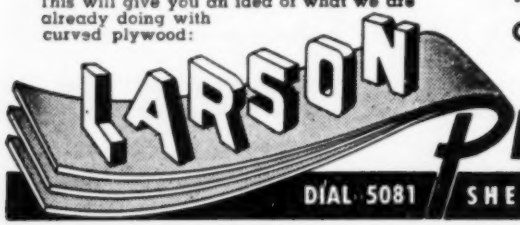

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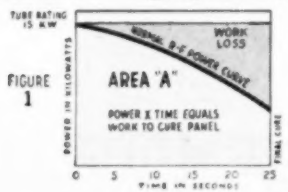
The heart of the Radio-Frequency unit is the main oscillator tube. To deliver its full capacity of high frequency power it must be in resonance or TUNE with the circuit in which both the tube and the load of wood and glue are a part.

BUT . . . each press load of stock to be glued varies from the load before in moisture content, glue line area, thickness, and number of glue lines. ALSO . . . during the curing cycle itself, the glue is constantly changing in electrical characteristics as well as in temperature and viscosity. SO every factor in the gluing operation tends to throw the circuit supplying the power out of TUNE. The result is that the R-F unit does less actual work than the rating of the oscillator tube would indicate.

Look at it graphically:

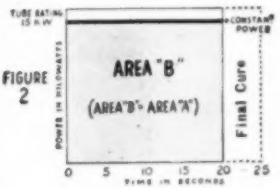
FIGURE 1



AUTOMATIC TUNING electrically adjusts the R-F unit during each curing cycle to deliver **full, constant rated power.** Since there is no power drop off toward the end of the cycle, constant power means more work performed by the R-F generator on the load being glued in a given period of time. Putting it another way, if a specific amount of work must be performed by the R-F unit to cure a specific panel, that amount of work will be performed up to 25% faster with automatic tuning.

See Figure 2

FIGURE 2



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Since this machine will handle any practical length of veneer, only one standard size is required, although a companion machine of the same general type is offered, for heavy duty on large production schedules.

Jointing Veneer With a Drop Knife in a Shearing Cut

Rotary cutter heads have been employed in all of the jointing operations so far illustrated. Most authorities agree that rotary cutting is not wholly satisfactory on veneer with angling or twisted grain, such as highly figured face veneers, because of the hazard of minute tears on the edge of the veneer. As a consequence such veneer is usually cut, in packs, on a drop knife cutter, frequently called a guillotine cutter, and resembling those used for paper cutting. The knife passes through the pack of veneer, some 2" to 4" thick, on a 45° angle, and provides smooth, square and straight edges, even on veneers with highly complicated grain figure. Since these drop knife machines dimension the veneer, the equivalent of clipping; and provide edges suitable for tapeless splicing, equivalent to jointing; they have been called by some, though incorrectly, either clippers or jointers, or both.

The modern types of these guillotine cutters for veneer, which are illustrated in Figs. 11 and 12, are hydraulic in operation, both for the pressure on the pack of veneer, and for the angling, or shear, stroke of the knife. Clamp pressures range up to 10 lb. p.s.i., and can be adjusted for gradual pressure application on wrinkled veneer.

The back gauges are in sections, of a finger type, interlocking with the clamp pressure bar, so that the minimum setting may be approximately 1". Gauges are motor operated in both di-

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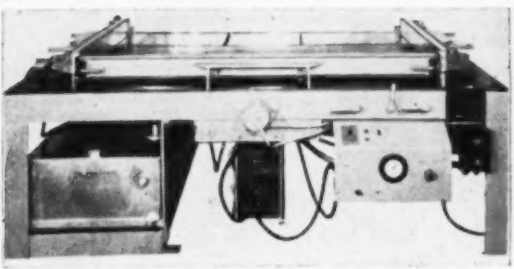
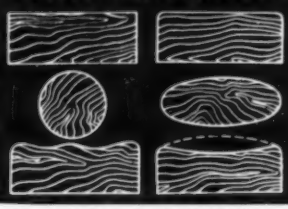


for such typical shapes as these



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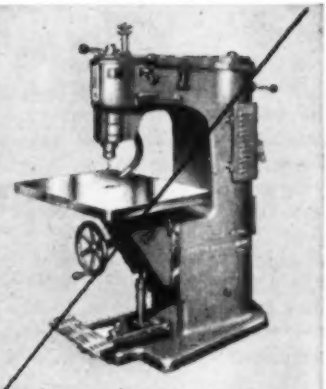

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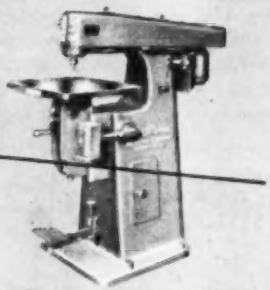
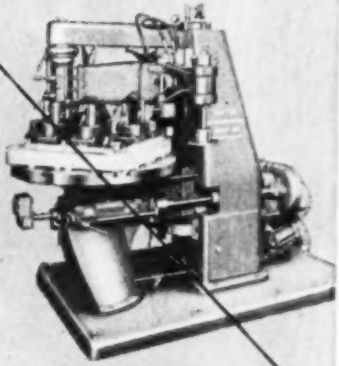


medium router . . . W-180



automatic shapers . . . capacities to shape a 1"x4" knife handle to a 36"x72" table top.

rections, with a hand wheel for final precision. The clamp bar can be lowered for observation, either by foot or hand levers. While the clamp bar usually has a clearance of from 5" to 7" above the table, the most accurate cutting is obtained with 3" packs of veneer.

These drop knife cutters are universally used for diamond, 45°, "V" and other geometric effects in veneer matching, where the grain of the wood is at a substantial angle with the edge. They are largely used on highly figured face veneers, such as crotches, burls, swirls and the like.

Conclusions

There is no dearth of variety in equipment designed for jointing veneers, and when properly used, all types of equipment give excellent results. However, there is still considerable difference of opinion among plywood operators as to which type of machine they prefer. Which again proves that "Competition is the life of trade"!

Since space does not allow descriptions of many phases of design, construction and operation in veneer jointing, interested readers are referred to the following manufacturers of veneer jointing equipment for more explicit information. These companies have been helpful in supplying the data and photographs for this article.

Rotary Cutting Jointers:

Merritt-Solem Corp., Lockport, N. Y.
Mereen-Johnson Machine Co., 4401 Lyndale Ave., Minneapolis 12, Minn.
G. M. Diehl Machine Works, Wabash, Indiana.
Veneer Machinery Company, Grand Rapids, Michigan.

Drop Knife Veneer Cutters:

Charles E. Francis Company, Huntington, Indiana.
Columbia Machinery & Engineering Corporation, Hamilton, Ohio.

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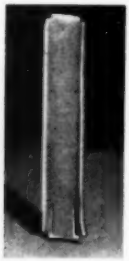

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DUST CONTROL

Soaking and Steaming PEELER LOGS

By G. A. Seidel and J. E. Hershberger

IT WAS suggested to one of the authors that he ask his wife how long she boiled potatoes. He learned that she used to boil potatoes as did her mother, her grandmother, her great-grandmother and so on. For the past few years, however, she has had a copper-clad stainless steel pan with a close fitting lid and uses the waterless method, which is essentially cooking by low pressure steam and much faster than boiling. There probably is nothing wrong with boiling potatoes but it isn't necessarily the best method of cooking them.

The authors believe our veneer industry has been too prone to continue using grandfather's method of heating or cooking logs. It is realized that with an investment in a certain type of equipment it is not always possible to change to a different type, but there are usually ways in which we can improve the method we use.

Basically, we have two mediums for heating logs, hot water or steam, with certain variations in the methods used in applying them. Probably the most commonly used are hot water vats, usually heated by injecting live steam into the water through manually controlled valves. The valves control the temperature, which is determined by using a bayonet type portable thermometer inserted into the vat at some convenient spot.

Water Vats

Improvements which can be made on this type of system are: (1) the use of radiators of some type in the bottom of the vat which makes it possible to have much better control and save steam by having a condensate return line; (2) have a recording thermometer with the bulb located where it will give you a representative reading, (3) thermostatically controlled steam valves so that the temperatures can be accurately controlled and regulated. In our opinion this is important for the correct heating of logs.

Water vats are usually of concrete construction, although in late years a number of mills have installed vats constructed from steel plate reinforced with angle and channel iron. The interior should be covered with some type of bitumastic or resin paint to minimize the possibility of getting iron stain in the ends of the logs. A cover of some type is usually used to minimize the heat loss.

When considering the construction of new vats it is well to consider making them large enough to accommodate full length logs. This was done at the Penokee Veneer Company and it was found that it eliminated a good percentage of the end checking.

Some objections to the use of water vats are the safety hazard, the possibility of greater end checking due to dumping cold logs into boiling water and the fact that hot water is considerably slower than steam.

Advantages of the water vats are: more uniform heating of individual

logs, better regulation of heat when properly controlled, and replacement of water in the outer shell of logs which have dried out. Where logs are stored under water this of course, is not a factor.

The Allen Quimby Veneer Company has one of the most ideal hot water vat systems known to the authors. It has been described as follows:

"No factor I know of has as much initial influence on the production rates of long veneer as the systems that are used to cook or steam logs before they are ready for the cutting lathe. Here again bear in mind that we are speaking only of birch and that in order to obtain sufficient yearly quantities of this species, we are required to take several grades in tree length form. As fast as these logs are received in the log yard, they are placed in water storage or sent directly to the vats before sawing into bolts or lathe length. The purpose of doing this is to eliminate insofar as possible the danger of block-end checks. Furthermore, our experience has led us to believe that cooking long logs in hot water is the best all around answer. With a vat holding a capacity of 140,000 board feet we are currently following a four day schedule of cooking. Of these four days, in the summertime the logs are held two and one-half to three days at 160°, then the temperature is increased the last one to one and one-half days to 200° or slightly over. In the wintertime, with frozen logs and extremely low temperatures, it is necessary to start the temperature rise a day early with a schedule of two days at 160° and two days increasing to and holding 200°. This cooking schedule for long logs produces a thoroughly saturated, thoroughly heated and a very uniform log to cut. It is ready to be removed from the vats any time that it is required but is not taken out more than 15 or 20 minutes before the lathe is ready to use it. Since this is a tree length log and since it has been cooked in the long length, it is a great deal easier to make the necessary bolts for 84" veneer. Most logs come with a 6" or 8" trim allowance on each end, so that after sawing there is little sign of block checking. Practically all of these blocks can be run on the lathe to the core without a sign of end checks in the veneer sheet.

"To provide this steaming cycle, our system of vats consists of reinforced concrete tanks 20' by 30' and 14' deep. A bridge crane with cross travel heads travels the length of the tanks. Between two of the middle tanks of the row, a carrier is provided for moving the logs indoors to the log saw which does the required cutting to block length. To load these tanks, logs are secured in sling chains with approximately 1,000 feet of logs to each sling and they are placed in empty tanks. As each tank is required for use, water is pumped from it into an adjacent tank which has been recently filled with fresh logs. As soon as the water is removed from the tank, the bridge crane is able to pick up the sling of logs and place it on the saw carrier."

This system eliminates in part the safety hazard in that the vats are loaded and unloaded when empty of water. This also makes it possible to get more logs in a vat of a given size and eliminates the ill effects of dumping cold logs into hot or boiling water.

Steam Vats

Steam as a direct medium for heating logs is used in several applications, the most common of which is a system of concrete vats or similar wooden enclosures which have perforated steam pipes in the bottom and occassionally about half way up the sides.

The logs are placed in these vats and covered with sawdust, allowing some of it to fill the space between the ends of the logs and the sides of the vats. After the logs are covered with the sawdust a canvas, or other type of cover, is placed over them to help retain the heat. When the steam is turned on it filters up through the logs and sawdust.

Disadvantages of this method are the lack of control and unequal heating of the logs. In many instances individual logs will have a wide variation in the temperature from one side to the other. In some cases the logs will become stained by the sawdust.

Another system using direct steam employs steam vats or chests which are built similar to water vats with wood or metal covers or in the form of a tunnel with close fitting doors on each end. The covers and doors are not pressure tight. Perforated steam pipes are installed in the bottom and the steam is allowed to circulate throughout the chest. A drain of some kind is usually provided to carry away the condensate.

This method also has the disadvantages of lack of control and the uneven heating of the logs although it is believed to be better than the sawdust vats in these respects, particularly if the logs are stacked to allow circulation between them.

A variation of this type of system, but about which we could get very little data, is a combination of water and steam. A tunnel is used, having about 6" of water in the bottom which is heated by steam coils. The heated water is picked up by a pump and sprayed over the logs. As it runs down it is again picked up and sprayed. This produces a completely saturated atmosphere. No data were available as to the heating cycle or the success of this method of heating.

Pressure Cooking

Probably the most recent and unconventional development in heating methods is the pressure cooker. Description furnished by Roddis Plywood Corporation, Marshfield, Wisconsin.

"These are usually large enough to accommodate 100" blocks across the tank. Pressure tight doors are installed at both ends of the tank so that the tank may be loaded at one end and unloaded at the other. These doors can be swung completely out of the way so that they do not interfere with either the loading or unloading operations. The operating pressure is controlled at approximately three pounds by the installation of a relief valve. When the doors are closed steam is introduced into the tank through perforated pipes running along the length of the tank at the top and bottom. The pipes are perforated so as to give uniform distribution of the incoming steam throughout the tank. Initially in the treatment of the logs, the condensation of the steam is so rapid that the relief valve is normally closed for 30 to 45 minutes. After the temperature has risen somewhat some steam will escape from the relief valve and, if desired, the supply of incoming steam may be reduced. A trap is provided at the bottom of the tank to drain off the condensate.

"The tank is constructed of ⅜" plate reinforced on 18" centers with 8" I-beams.

"The principal advantage of the pressure cooker is the reduced time required to cook the logs and a reduction in the amount of end checking which occurs."

Judging the Several Systems

We might say that this pressure

cooker system and the hot water vat system described as used by the Allen Quimby Veneer Company are the ultimate in the two basic systems. The only definite advantage of one over the other is that the steam pressure cooker reduces the cooking time. The question of, which one prepares the logs to give us the best quality veneer is still debatable.

As stated these are the ultimate and if our particular system falls short of one or the other we must try to determine how we might overcome these shortcomings.

So that we will judge from the same basis, we will consider the heating or cooking of relatively high density logs. Experimental data indicate that density rather than species is the governing factor and as the density increases proper heating becomes more important.[1, 2]

Other factors to be considered in judging a system for heating logs are:

1. Uniform heating of logs.
2. Heating cycle required to obtain thoroughly heated logs.
3. Optimum temperature for cutting.
4. Importance of proper temperature control.
5. Importance of keeping adequate records.
6. Ease of removing bark.
7. Safety hazards.
8. Amount of end checking.
9. Effect of mechanical condition of lathe and other equipment.

For the uniform heating of logs it is generally admitted that hot water gives the best results although it is believed that the pressure cooker is just as satisfactory. One problem in all cases is the variation in the diameter of the logs. It has been suggested that heating schedules be set up for logs of average diameter and when one of larger diameter is encountered it could be partially cut and then returned to the vat. This may not always be a practical solution. Another suggested solution is to sort the logs for size and group them so that the larger diameter logs are given a longer schedule. This could be accomplished without too much difficulty.

Heating Cycles

This then brings us to the heating cycle required to obtain thoroughly and properly heated logs. You will recall that the schedule recommended for birch by Quimby was 72 hours in order to obtain a thoroughly heated log. We feel, however, that their temperature of 200° or more is a trifle high and likely to result in fuzzy cutting of some logs. By using a potentiometer we have checked temperatures at the outside, partially through the cut and at the core of logs which have been heated in water vats at 170° to 180°. For logs averaging 18" in diameter it required 48 to 72 hours to get them conditioned so that they were a constant temperature throughout. The tests were carried on during the late summer and early fall so that frozen logs were not involved. The number of tests made was enough to give us an indication but we hope to carry it further in order to make it more conclusive. In data on Australian timbers of a density approximately the same as birch we find that in order to have a temperature of 124° F. at the core a 24" diameter log was heated in hot water at 180° F. for 49 hours.[2]

It is probable that if other veneer mills made similar checks they would find that any schedule of less than 48 hours during summer months is giving

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[1] Fleischer, H. O. Heating Veneer Logs.
[2] Commonwealth Scientific & Industrial Research Organization. Suitability of Australian Timber for Veneers. Bulletin No. 260.

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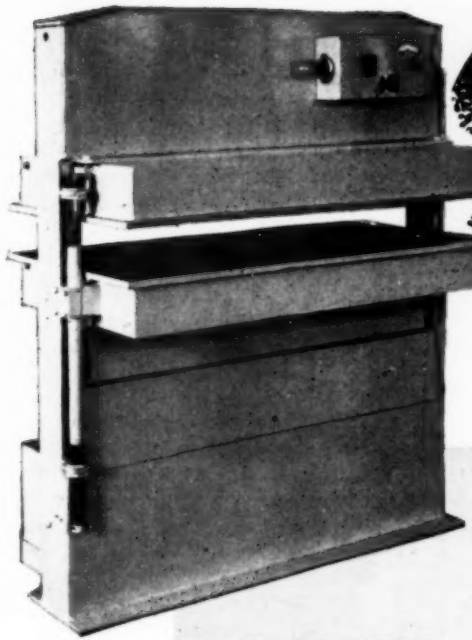

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them insufficient heating of the logs for cutting high quality veneers.

The question of what is the optimum temperature for cutting, of course, depends somewhat on what purpose the veneer is to be used for. Let us consider only face veneers which require the smoothest and highest degree of quality cutting, although it is a common fault to take too lightly the necessity of having smoothly cut veneers for crossbanding and cores.

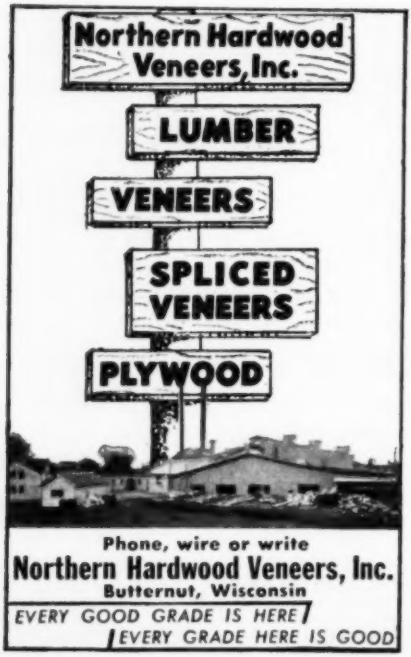
The general consensus is the optimum temperature for cutting a species such as birch is 160° F. to 180° F. However, we question whether in most cases, although the water temperature is held at this, the cutting temperature of the logs will be much above 140° F. Actually, if a log temperature of 140° F. is obtained we believe the logs will cut satisfactorily.

Other Considerations

In order to properly heat the logs, proper temperature control must be maintained. The best way to do this is, of course, to have a completely automatically controlled system with temperature-controlled valves and recording thermometers.

Everyone is not able to do this but even with manually controlled valves and portable thermometers much can be gained by keeping complete records. Record forms should be made up so that hourly checks can be made and recorded. The results of smoother and easier cutting of logs is the reward for the extra effort.

There is always a good deal of discussion regarding the ease of removing bark and sometimes an entire heating schedule will be predicated on this, with little thought given to the effect on the log with reference to end splits and cutting qualities. With present day log prices the first consideration should



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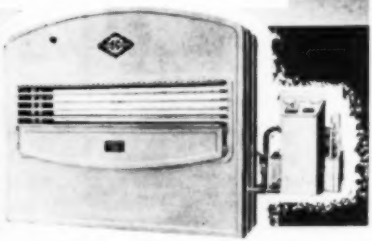

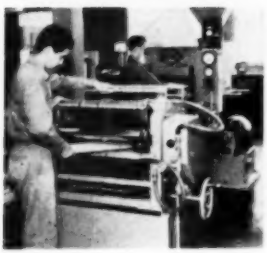

A typical installation shown at the left in the Reichhold Chemicals, Incorporated laboratories in Charlotte, N. C. plant.

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be veneer quality and yield. We can well afford a small amount of extra labor at peeling bark if we can increase the yield and improve the quality.

The safety advantage of steam over water has been mentioned before. In a water system where the vats are loaded and unloaded dry most of this hazard has been eliminated. Where conventional water vats are used incidents of persons being scalded are usually a result of carelessness. A well directed safety program and use of up-to-date safety devices can greatly minimize this hazard.

The question of end checking seems to be one of the most debatable. We have received comments from numerous people in absolute contradiction to each other.

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LIGHT FAST write for further information

Money and time saved by this versatile SAFETY FEED! Switch from Shaper to Jointer, Saw or Sander quickly and conveniently. No complicated setups. Make or brand of machine does not prevent use of E-Z Feed. Sand exposed edges of furniture panels in half time required for hand feeding. Fluting, grooving etc. on saw become SAFE operations. Hazardous jobs on jointer made safe and easy.

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Apparently heating with steam causes less checking and the majority of the opinions bear out the fact that logs heated in water will leave less end checking if the temperature of the water is quite low when the logs are put in.

In some cases improper heating of logs is blamed for some mechanical deficiency of the lathe or carelessness on the part of the operator. The one way to eliminate this possibility is to get the vat system developed to the best degree of efficiency as it possible, set up a heating schedule after thoroughly investigating everything possible to insure properly conditioned logs reaching the cutting lathe.

Importance of Improving Heating

The importance of properly conditioning logs before cutting has never been fully appreciated. The majority of veneer cutters being rugged individualists with their own ideas and beliefs based usually only on the fact that they or their fathers before them have always done it a certain way, there is very little information available based on actual recorded data relative to the heating of logs. We may think we are doing a satisfactory job but unless we try new methods and keep accurate records we cannot be sure. What may have been acceptable in the past, when logs were plentiful and reasonable in cost, may not be now. With top grade veneer logs in shorter supply and logs costs continually mounting we must get maximum yield of quality veneers from every log. Without proper heating this is impossible and we should realize that the small investment which might be required to modernize a vat system will be repaid in a short time by increased yields and up-grading veneers. Likewise, the small amount of additional effort required to see that a proper

schedule is set up and carried out will also pay dividends. We know that very seldom is an improperly conditioned log dropped at the lathe and returned to the vat after the cut has been started. We should, therefore, do everything possible to insure properly conditioned logs reaching the cutting lathe.

Mr. Seidel, vice-president of Splicedwood Corp., and Mr. Hershberger, plant manager of Penokee Veneer Co., presented this material at a Forest Products Research Society meeting. It is reprinted with permission.

DRY LUMBER

"Build Better With Dry Lumber," a 20-page booklet that explains seasoning and the benefits of dry lumber, has been published by Southern Pine Association, Box 1170, New Orleans, La.

The new S.P.A. publication is being distributed to groups of architects, contractors, lumber dealers and government agencies, as well as to prospective home builders.

STOP DUST

DUSTKOPS — **20 Models**
UNIT TYPE — 300 to 3600 cfm
LOW COST — ¼ hp to 5 hp

AVAILABLE FROM STOCK

For: Grinders, buffers, polishers, woodworking, lint . . . All Dusts.

Send for Cat. 605a; describe problem.

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NEW! More Powerful! *MODEL No. 2*

RIPS AND CROSS-CUTS 2 INCH PLANKS

WHIZ-SAW #2, one of the most versatile cutting tools ever invented, cuts with amazing speed . . . wood, bone, plastic, fibre, asbestos board, pressed wood, hard rubber, etc., up to 2 inch thicknesses. Ideal for all craftsmen. The *original* **WHIZ-SAW** #1 cuts up to 1 inch thickness. **($55.00) WHIRL-SAW,** 4½ inch circular blade, cuts up to 1¾ inch thickness. **($49.00)**

$130.00

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THE Forsberg MFG. CO., BRIDGEPORT 1, CONN.

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MODEL XJ

(stationary table) may be had with five alternative tables, to give you a machine which is virtually custom built to provide the last degree of efficiency on your particular type of work. Below: Model XJS—with sliding left section table.

When you go shopping for a mitre saw bench keep in mind the very important fact that Tannewitz not only originated the Tilting Arbor Saw, but ever since its inception many years ago, The Tannewitz Works has constantly devoted itself to the development of both structural and functional features that would provide the very maximum of production, accuracy, convenience of operation and long-wearing, trouble-free service. Wherever you go you'll find that they are rated "tops" with the men who operate and own them.

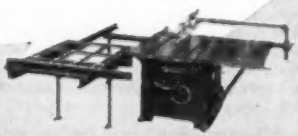
Whether you want a relatively inexpensive mitre saw bench or the finest that has ever been devised, you'll find it in the Tannewitz line. Let us help you select the one best suited to your production requirements. Drop us a line for complete information.

The TANNEWITZ WORKS

GRAND RAPIDS, MICHIGAN

XJSW— with extended table at right

XJSW — with J-430 extended sliding table at left



XJW — with J-420 removable roll-table at left

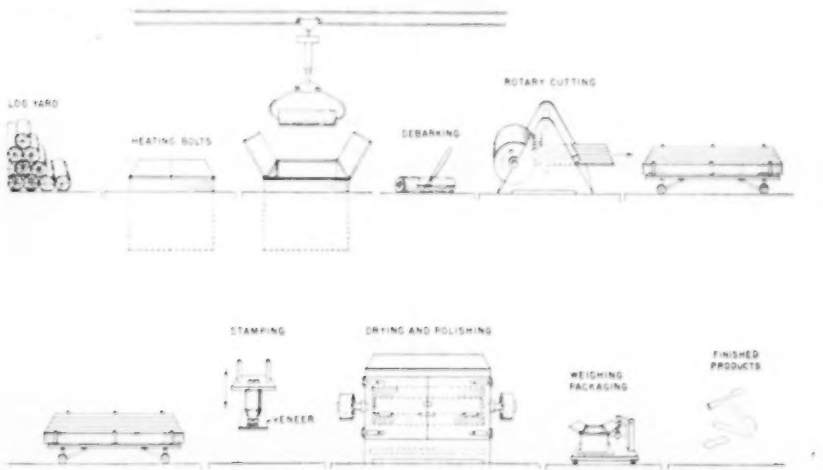
STAMPING Small Items From Veneer

SMALL wood items such as ice cream spoons, popsicle sticks, tongue depressors, coffee stirrers and the like are generally made by stamping them from veneer. Preferred species for this purpose have wood of very light color, do not impart odor or taste to foodstuffs, and are adequately strong for the purpose. White birch, sweetgum, maple and beech are used. At the present time the industry is concentrated largely in the Northeastern and Middle Atlantic states.

Logs or bolts required by manufacturers may be relatively small diameter and from two to three feet long. Before cutting, these bolts are heated in steam or in boiling water. Because of the small size of the bolts, heating cycles as short as two hours may sometimes be adequate for good cutting.

A single small lathe having a knife 26" or 32" long and spindles 2" or 3" in diameter may produce enough veneer for a battery of three or four stamping machines. The lathe may be equipped with a series of spur knives, mounted on the carriage. These cut into the surface of the bolt as it approaches the knife, so that the veneer emerges in a series of ribbons suitable for the stamping press. The ribbons are piled on long trucks for conveying to the stampers. Veneer used for many small stamped items is 1/15" or 1/16" thick.

The stamping press is characterized by two synchronized movements: the up-and-down movement of one or two stamping dies, and the intermittent movement of the veneer infeed rollers. The operator keeps a supply of veneer



Flow of wood through a plant making small stamped veneer items.

VENEER

BIRCH-MAPLE

BASSWOOD

ROTARY CUT
SINGLE PLY

RANDOM & DIMENSION
WIDTHS — LENGTHS TO 100″

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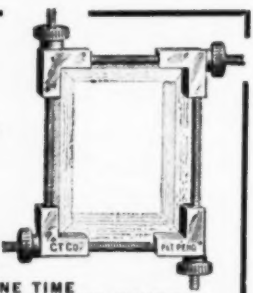

- MAKE PERFECT JOINTS
- DOES FOUR CORNERS AT ONE TIME
- DOES NOT MUTILATE THE MATERIAL
- CAN BE USED ON HIGHLY FINISHED WORK

Available from stock in four popular sizes, 8″, 12″, 18″, 24″. Larger sizes can be furnished when required. Minimum capacity all sizes 2″ by 2″.

The corner pieces are Aluminum, drilled to permit the use of brads when desired; the spindles and adjusting nuts are Steel.

Hobbyists, Home Craftsmen, Picture Framers and other Professional Woodworkers will welcome this easy to operated Clamp.

WRITE FOR CATALOG: Showing A CLAMP FOR EVERY PURPOSE, openings from ¾″ to 12′ and depths from ½″ to 16″.

THE CINCINNATI TOOL COMPANY
1949 Waverly Ave. Cincinnati 12, Ohio

ribbons entering the machine. In many machines the veneer is piled about 1″ high as it passes under the die. In faster operating machines similar to metal punch presses, only about three thicknesses are stamped at one stroke. The dies used are similar to hollow-center punches, shaped as required for the particular product, and ground with the bevel toward the outside. The stamped items pass upward through the die and are forced out at its top, whereas the trim portions of veneer fall off on the side to a waste conveyor. A single machine may produce 30,000 small stamped items per hour.

Stamped items are dried by placing them in large tumbling drums made of perforated metal. These drums revolve slowly in heated chambers, the drying being accomplished in a period varying from five minutes to several hours, depending on the load, the temperature and the degree of air circulation. During the latter part of the tumbling operation they begin to take on a polish because of the rubbing action in the tumbler. A few handfuls of paraffin shavings are added in the tumbler to assist in providing a good polish. To prevent warping of the stamped items they must not be dried to an excessively low m. c.

It is reported that ingenious machines have been developed for sorting broken and warped items from usable items. As far as is known, these are not standard machines, nor are they generally available. The bending or molding of curved or dished veneer items, such as spoons, is done in heated molds. The packaging of small items in individual paper wrappers is done by highly specialized, patented machinery.

The flow of material through a plant making small stamped veneer items is illustrated on the accompanying sketch.

This is a report from the Forest Products Laboratory, Madison, Wisconsin.

FASTER HOLE PRODUCTION

WITH

Commander MULTI-DRILLS

● Drills up to 8 Holes at 1 Stroke ● Fits Any Drill Press
● Adjustable to Any Hole Pattern
● Quickly Pays for Itself Many Times Over

● Commander MULTI-DRILLS are instantly and easily adjusted to handle any hole pattern within a 9" circle. Standard Extension Spindles will increase working area to 22½". Minimum center distances close as ½". Compact in design, ruggedly built, Commander MULTI-DRILLS are making BIG Savings in time and labor for woodworking plants everywhere. Special adaptations available.

Write FOR CATALOG #851 which describes Commander's Production Tools

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Commander MFG. CO.

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HIGH QUALITY - LOW IN PRICE

SIMONDS New SI-CLONE SAWS

SCIENTIFICALLY HEAT TREATED • ACCURATELY GROUND
CUTS STRAIGHT • FAST • SMOOTH — STAYS SHARP

This complete new line of circular saws UP TO 12" in diameter, will give long, satisfactory service, excellent performance and the most value for the least cost. For use on all makes of table, bench, swing, radial arm and portable electric hand saw machines.

TYPE OF SAW	SIZE	PRICE
Cut-off	6"	$1.75
Rip	7"	2.00
Combination	8"	2.15
52, 54, 60	10"	3.15
Easy Cut	12"	4.35

TYPE OF SAW	SIZE	PRICE
Hollow	6"	$2.75
Ground	8"	3.95
Planer	10"	7.45
	12"	9.95

ALL SAWS SHIPPED POSTPAID EXCEPT C.O.D. ORDERS. SPECIFY BORE WHEN ORDERING, OR IF PORTABLE ELECTRIC SPECIFY MAKE AND MODEL. SEND FOR LITERATURE.

Each saw is individually packaged, in factory-perfect condition, ready for use.

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Style WB—with bronze spatula temples or half-plastic, half-cable temples; Style WBS has matching sideshields.

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SAFETY BOOKLET

"Working Together for Safety" is the title of the National Safety Council's new employee rules manual. The handy 32-page booklet contains instructions in safe work habits applicable to employees in most plants.

The practical experiences of workers, supervisors and safety specialists have established the safe practices covered, beginning with a list of general safety regulations and continuing with special sections on machine operation, hand tools, power tools, protective clothing, fire prevention, materials handling and many other related topics. The booklet is available from the National Safety Council, 425 N. Michigan Ave., Chicago Ill.

Bound in a heavy paper cover and printed in two colors, "Working Together for Safety" will serve as a permanent guide and handy reference for each employee.

Personal Interest BUILDS SAFETY

By Pete DeWeese

THIS article is being written, not as an author, but as an ordinary manufacturer to whom this business of safety has been graphically and dramatically illustrated as something that pays off in cold hard cash.

Here at the DeWeese Lumber Company, (Philadelphia, Miss.) we believe that to have a successful safety campaign or program one must consider the whole subject of safety as an attitude. We also believe that an attitude can be changed, given any sort of objective or open-minded point of view. It is hard to change the average human being's opinions. And the reason they are hard to change is because the average individual refuses to maintain a good objective attitude.

As a manufacturer of southern pine lumber we have received a great deal of acclaim because of our safety record. Such attention given to a safety record which should be the rule rather than the exception indicates that our industry should wake up to this business of safety. We are not trying to imply that, through false modesty, we are not proud of our record, nor do we want to convey the impression that it does not require careful study, thought and effort to have a really sound safety program.

The DeWeese Company is now, and has been for the last 16 or 17 years, being operated by the second generation of our family. When we took over the operation of the plant, we naturally placed a great deal of confidence in the older employees. In fact, we adopted the attitude that as long as all these old faithful employees were around things would pretty well take care of themselves. Actually, we let our personal relationship with our employees become rather matter-of-fact and accepted it as something that just happened. However, there was a gradual change in our employee turn-over during a period of years which you might say caught us napping.

There were enough of the older men around to give the general idea that we still had the same old loyal crew. But instead we had had quite a large turnover in employment, especially during the war years. The older employees now numbered less than 25% of our entire personnel. As of today, approximately one-third of our men have been with us ten years or longer.

FIELD

CHAIN MORTISE CUTTING EQUIPMENT

A TOOL ROOM Product

By A Tool Room Expert!

Use our double bearing guide bars for flat bottom mortises. The riveted plate and bearing construction provides the utmost in strength and interchangeability. More than 90 standard sizes in the FIELD line of cutting equipment. We are well-equipped to furnish special sizes like the above bar in many widths and lengths.

Write for complete information on our chain mortising equipment.

WILLIAM H. FIELD CO.
327 Dorchester Ave • Boston, Mass.

A rash of serious and costly accidents during the years 1947-49 finally woke us from our lethargy. We suddenly came up against the fact that we were trying to operate a business without any real employer-employee connection that could even mildly be considered good.

This put us to thinking seriously. Uppermost in our minds was the thought that one of the best ways in the world to gain the confidence of the employees was to take a personal interest in them. How better could this be done than through sound safety proceedings?

Our first step was to really get acquainted with our foremen. It is, of course, elementary that no business can be successfully run unless management and the key employees have mutual respect and trust for each other. Through suggestions of these same foremen, we soon hit upon the plan of having regular monthly meetings with our key men and foremen. We would get together each month after a really good meal, to discuss our common problems. Our policy was to keep away from long drawn-out instructive meetings. All of the talks were short and to the point. We took these key men into our confidence and did not hesitate to read them a monthly financial statement showing them all costs by departments as well as profits or lack of them.

Our employees were told that if the company made a reasonable profit, they would share in that profit by year-end bonuses. They, therefore, would know by the monthly statements whether or not we were nearing the bonus goal.

A discussion of safety was an important part of these meetings with our foremen. There was only one department in our plant where the men seemed to think this was rather a foolish childish approach to man's work. We might add that this department was the last to catch on to the general idea

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Directs light exactly as needed as easily as pointing your finger

LOCALITES

for Machine Tools, Assembly and Inspection Benches

NEARLY A MILLION NOW IN USE

MODEL 3470-P-172
Overall length 48¼". Three instantly adjustable joints. Circular base for machine or wood screw mounting.

$7.16 EACH
in package of 6
Single Units **$8.95** Each

- **Rugged Construction** withstands vibration and rough handling
- **Instantly Adjustable** with flexible ball and socket joints
- **Reflector** accommodates 100 watt or any A-19 or A-21 medium screw base lamp
- **Baked Enamel Finish** — Exterior, smooth Gray — Reflector Interior, high temperature White
- **Wired Complete** with switch socket and 8-ft. oil-resistant cord and moulded plug

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Write for complete catalog of Localite models with various type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO
Localites available through wholesalers everywhere

of safety. But we are proud to say that now this department is well into its third year without a lost-time accident.

Surprisingly, the department where there was the most danger of accidents happening seemed to get the best grasp of the idea as we began this project. As a result, this department had two years and three months of no lost-time accidents. It is now well into its second year of no lost-time accidents. At present there is not a department in our entire operation but what has enjoyed at least two years during which there have been no lost-time accidents!

Last year our Bay Springs, Miss., operation enjoyed a full year with no lost-time accidents. Here at Philadelphia, Miss., there were three minor lost-time accidents.

Here is the way we carry out our program. We let our people know that they are engaged in a hazardous occupation. Every man who comes on the

REES *Burners*

For SAWMILLS and WOODWORKING PLANTS

WHIRLWIND BURNING ACTION:
Controlled draft. Complete combustion—Less Smoke. Less Ash.

SAFE:
Passes existing codes for Fire Prevention and Structural Stability.

LONGER LIFE:
Prefabricated in small sections, any section replaceable anytime.

ERECTION:
Instructions supplied with each burner for easy erection by your crew

Write for Bulletin No. 37

Rees Blow Pipe Mfg. Co., Inc.
340 - 7th Street, San Francisco 3, Calif.

job is told the dangers of his work. We further tell him that we expect him to exercise due caution in the performance of his duties. For emphasis we also tell this same man, and continue this philosophy throughout our safety meetings, that we are not going to penalize him for hurting himself. However, if he is the direct cause of an accident to a fellow employee, then we certainly intend to take punitive action. We tell him, in a sense, that it is his business if he hurts himself, but we will not have a man in our employ who thinks so little of his fellowmen that he will not help make this a safe place to work!

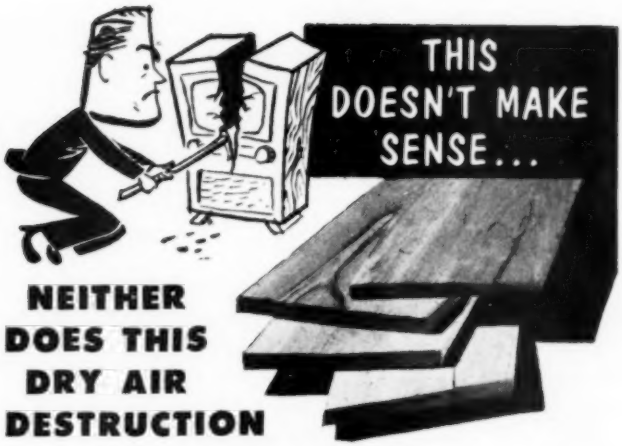
We try to have each department with 100% representation at our safety meetings. We prefer to have at least two monthly meetings for each department. These meetings are short and are held on our own time.

Our foremen are a very important part of these meetings. By all means we try to get their ideas. We treat any suggestions with the utmost respect and carry them out to the fullest, if they are practical to our operation.

It goes without saying that we try to use all possible safety devices, but we know that there is no such thing as a fool-proof machine. Therefore, we place our emphasis on the individual and his attitude toward the work. We believe in signs of warning and admonition. We also keep posted the number of days of no lost-time accidents for each department.

We believe in all of these, but primarily we believe that the essence of safety lies within the individual—his satisfaction with his job, his attitude toward his fellowmen and a feeling of dignity in that the management of the company respects him for what he is and does.

Perhaps our ideas are not universally applicable, but again we state that the basis of our entire success is mutual respect, gentle but firm discipline and



NEITHER DOES THIS DRY AIR DESTRUCTION

ARMSTRONG STEAM HUMIDIFIERS are a low cost solution to the winter dry air problem. They have been proven in many leading plants in your industry. Ask for a list of users.

Now is the time to prepare for next winter. Fill in and mail the coupon; it costs nothing to learn about steam humidification.

ARMSTRONG MACHINE WORKS
863 Maple Street, Three Rivers, Michigan

☐ Have Representative call
☐ Send free humidifier literature

*Name*_____

PLEASE PRINT

CLIP TO LETTERHEAD AND MAIL

a background of experience that dramatically shows each man that this business of safety pays off in dollars and cents for him personally.

We try to emphasize that we are all standing in the presence of each other at our meetings not knowing who would be missing had one of us committed a careless act!

SAFETY SLOGANS

Here are a few safety slogans which may be of some use to you:

A Wound Neglected May be A Wound Infected.

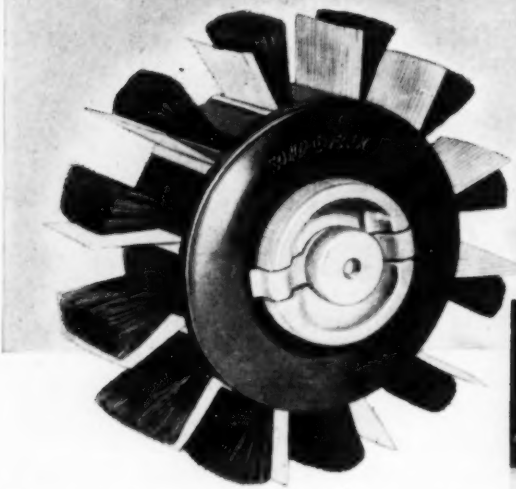
No Sense and Nonsense Cause Most Accidents.

Accidents Are No Respecters of Purse Or Persons.

WHAT HAS NOT HAPPENED FOR 20 YEARS MAY HAPPEN IN 20 MINUTES

SAND-O-FLEX

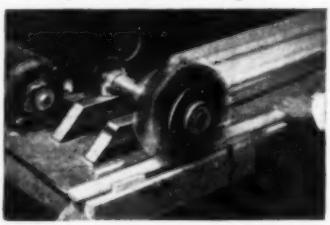
ALL PURPOSE CONTOUR SANDER



- **Speeds Up Sanding and Finishing**
- **Gets at Hard-to-reach places**
- **Fits on your present tools**

Above—Used with electric hand drill to refinish poster on antique bed.

Below—Mounted for fast finishing of flat strips with rounded edges.



On any wood surface, curved or flat, Sand-O-Flex wheels produce the surface you want... *quickly.* Flexible brushes back up the abrasive strips and conform them to the shape of the object sanded. On uneven surfaces you easily, speedily sand recessed areas that would be hard to reach any other way. Sand-O-Flex puts beautiful satin finishes on metal and is equally effective on plastics and other materials that require sanding, de-burring or finishing. As abrasive strips become worn, twisting a knob feeds out fresh abrasive from the reel inside the wheel. Replacement abrasive strips in many grits are available and easily inserted.

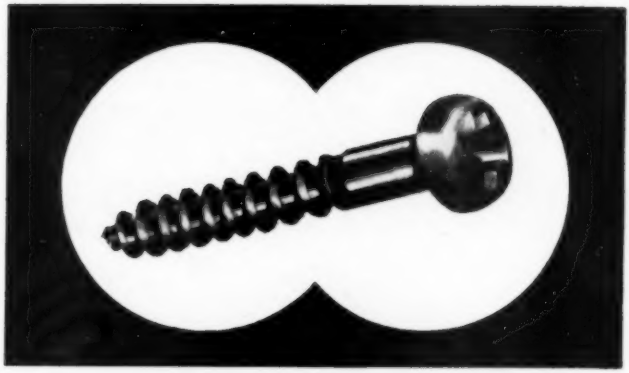
Use Sand-O-Flex wheels on your present equipment . . . adaptors available for lathes, mandrels, drill presses, flexible shafts and electric hand drills.

Write for descriptive literature and price list.

Sanding Problem?

Write us about it. Our experts will gladly study your problem, and they have a way of producing sound suggestions. No obligation... write us today.

MERIT PRODUCTS, INC., 4023 Irving Place, Culver City, Calif.



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Phillips or Slotted? Flat, round, or oval?

In widest range of sizes?

Then buy Southern — a QUALITY WOOD SCREW. Starts fast, drives straight, holds tight. All made to Federal Specifications FF-S-111a.

Also in **bronze, brass, and chrome plated brass.**

Shipment from Stock!

For easier driving —

FREE **Wood Screw Lubrication on request.**

Write for free catalogue today.

SOUTHERN SCREW CO.

Manufacturer of Wood Screws

FACTORY WAREHOUSES

North Bergen, N.J. Chicago 10, Ill. Los Angeles 23, Cal.

New Literature

WIRE STITCHING

Acme Steel Company, 2840 Archer Ave., Chicago, Ill., announces the availability of a four-page, two-color bulletin describing the new method of arcuate wire stitching.

The bulletin describes how a wire stitching machine puts an arc in a cross-section of flat wire and then drives and clinches the stitch at high speed. It explains how arcuate (pronounced R-Q-IT) stitching cuts wire costs, makes neater looking boxes and reduces machine down time.

Diagrams illustrate the basic principle of using an arc-shaped cross-section to strengthen wire. A table, showing standard wire sizes, is also included.

An Acme Steel box stitcher and a conversion parts kit are illustrated on the back page. Automatic or manually operated machines are quickly and

Hanna *Fluid Power* Cylinders give you

POWER for production

Hanna Pneumatic and Hydraulic Cylinder power helps cut production costs and increases production in your plant by replacing manual operations with perfectly controlled power. "Cylinder Power in Action" shows you 27 different ways you can put Hanna Cylinders to work for you. Write for free Bulletin 255 TODAY!

Hanna Engineering Works

HYDRAULIC AND PNEUMATIC EQUIPMENT · CYLINDERS · VALVES · RIVETERS

1770 ELSTON AVENUE • CHICAGO 22, ILLINOIS

easily adapted to the arcuate method with the conversion parts kits. Another section of the bulletin describes Acme Steel silverstitch stitching wire.

RESORCINOL APPLICATIONS

Uses of resorcinol, an intermediate chemical for pharmaceutical and industrial production, have been described in a 16-page illustrated booklet published by the Chemical Division of Koppers Company, Inc., Pittsburgh 19, Pa.

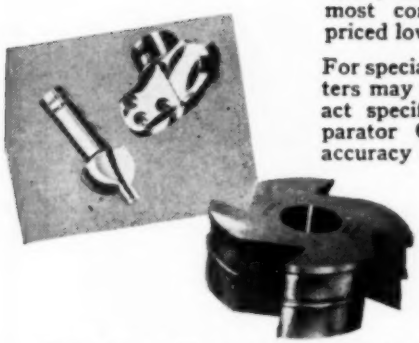
Listing and illustrating finished products in whose manufacture resorcinol plays a valuable part, the booklet cites the use of the chemical in low temperature bonding adhesives, medicines, cosmetics, tire cord adhesives, small arms ammunition, plastics, graphic arts, etc.

Included in the booklet is brief historical background information con-

standard pattern cutters or made to order

Onsrud offers a wide variety of high speed steel and carbide tipped cutters in standard patterns, designed to meet the most common requirements, priced low, and available now.

For special needs, Onsrud Cutters may be made to your exact specifications and "Comparator Checked" to assure accuracy of profile.



Our 72 page illustrated catalog gives prices and specifications on hundreds of "stock" items . . . and a formula by which you can estimate "specials" yourself! You should keep this catalog handy for reference when buying cutters or planning your work. Send for it today.

Onsrud Cutter Manufacturing Co.

801-21 E. Broadway Libertyville, Illinois

cerning the chemical as well as technical data including specifications and properties of commercial interest.

BETTER BONDS

The Black Brothers Co., Mendota, Ill., has published a special edition of its house organ, "Better Bonds," in honor of the town's centennial jubilee.

This issue shows some early pictures of Black Brothers, Mendota's oldest manufacturing establishment. A history of the company is included. Special feature of the magazine is a report by Robert S. Black on "Custom Built Roller Coaters."

CABINETMAKING AND MILLWORK

This book has been published by the American Technical Society, Chicago, Ill. It is available for $4.95. Authors are Alf A. Dahl, head of the building

ESSENTIAL IN ALL WOOD FABRICATION SHOPS!

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WORKRITE
MODEL WP 2700 . . .

This powerful machine sets glue to perfect bond. Pull trigger—in 3 seconds, job is done. Welds Wet or dry woods, formica, masonite, micarta, etc.

Three powerful models to choose from.

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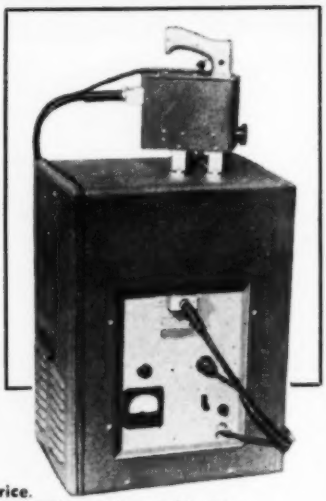

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1. More Power at new low price.
2. Heavy duty hand gun with NEW non-breakable legs.
3. Maximum heat indicators located in hand gun and panel.
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6. Complies with U.S. Safety Code—Federal Communications Regulations.
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WRITE FOR FREE ILLUSTRATED FOLDER, DEPT. 8

trades department of the Los Angeles Trade-Technical Junior College and J. Douglas Wilson, curriculum supervisor. trades and industries, Los Angeles city schools.

After an opening chapter on the history of cabinetmaking, the authors discuss woodworking tools, fundamentals of blueprint reading, board measure, fundamentals of stock billing, geometrical shop layout jobs, lumber adhesives, veneers and plywood. The book is very well illustrated.

"SHORTY," SHORT MOLDING

"Shorty," a piece of molding just 3'6" long who thought he hadn't a future to speak of—or a past either—is the hero of a 10-page Western Pine association booklet just published.

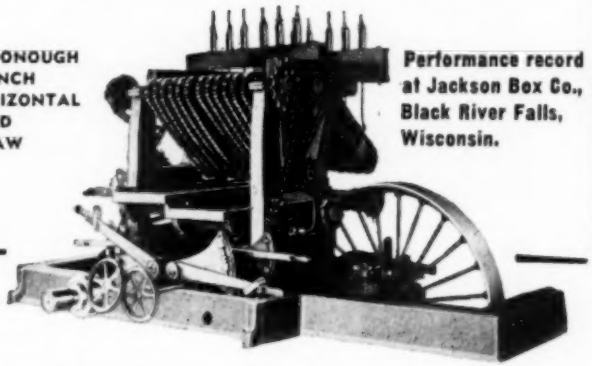
The publication describes the extensive uses "Shorty" can be put to in the building and "do-it-yourself" trade. It was put out for distribution to retailers, builders and contractors in an effort to obtain a fuller use of "Shorty,"

Saws 120,000,000 board feet in . . .

24 years

. . . with only $43.40 average annual repair parts cost

McDONOUGH 62-INCH HORIZONTAL BAND RESAW



Performance record at Jackson Box Co., Black River Falls, Wisconsin.

MR. DALBY, mill manager, says, "Our McDonough 62" Horizontal Band Resaw easily cuts 25,000 board feet day after day. We get the maximum usable boards out of every log, with a saving in time, because McDonough's split table lets us saw 5/4 and 4/4 at the same time."

Find out about the features of the McDonough 62" Horizontal Band Resaw that can increase your lumber output and decrease your maintenance costs. Send for Bulletin H-62-1.

World's Largest Producer of Band Resaws

McDONOUGH MANUFACTURING CO.

1503 GALLOWAY EAU CLAIRE, WISCONSIN

and other short moldings like him, in the industry.

Another leaflet, "What is Brown Stain in Sugar Pine," has also been released by the association. It quotes Western Pine association laboratory reports showing brown stain is not a mold, rot or decay and does not affect the strength of the wood in any way.

A third folder, a revision of an earlier publication, has been released which outlines the use of Western Pine movie playlets by retailers for advertising the Western Pine woods.

These publications may be obtained by writing the Western Pine Association, Yeon Building, Portland 4, Oregon.

CASTING RESIN

This book can be used as an operating manual, as well as a book of facts on casting resins — their uses, their

WANTED!
Adhesive Problems

Our Laboratories are anxious to work on adhesive problems which others have failed to solve.

We have developed adhesives for

Plastic	Glass	Leather
Fabric	Pliofilm	Plywood
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and many other materials.

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Ask For Literature

EFFICIENT, ECONOMICAL

Jakes Foundry Co.
400 - 29th Ave. Nashville, Tenn.

properties, their applications and the latest methods of handling them. The book has been written and produced by the technical staff of the Marblette Corp., 37-27 Thirtieth St., Long Island City 1, N.Y.

Divisions of the book discuss the preparation of the mold—and the various materials used for molds; machining, finishing and fabricating; applications of Marblette resins and the importance of choosing the right resin for the job.

LUMBER STOP

Irvington Machine Works has just released a new two color folder on the Irvington No. 15 Accura-gauge lumber stop and graduated bar. This stop, used wherever accuracy and durability are essential, is fully described and its operation graphically illustrated.

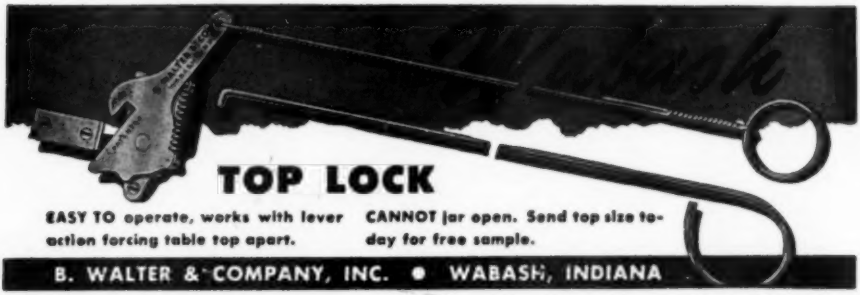
The folder, issued by Irvington Machine Works, 1808 N.E. 7th Ave., Portland 12, Oregon or 3 Colfax N.E., Grand Rapids 5, Mich., shows how micrometer adjustments for any measurement desired and how accurate cuts (as close as 3/4" between stops) are possible.

DRILL PRESS SAFETY-GUIDE

The Walker-Turner Division, Kearney and Trecker Corporation, Plainfield, New Jersey recently announced a new type of drill press work guide and holder. It is said that the safety guide will eliminate "C" clamps and other types of fastening devices. Attaching directly to the column of the drill press, the safety guide is fully adjustable on the table and is firmly locked in position with one locking screw.

It can be used to hold and position work without other fixtures, be used in conjunction with jigs or can be used to hold a standard drill press vise.

The Walker-Turner safety guide will fit any drill press having either 2¾" or 3¾" columns. Models are available for bench, floor and multiple spindle type drill press.



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EASY TO operate, works with lever action forcing table top apart. CANNOT jar open. Send top size today for free sample.

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1 car 5/8" Fas Oak

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1 car 5/4" No. 1 Com. & Sel. Red Oak

1 car 4/4" Log Run Willow

2 cars 8/4" No. 1 Com. & Btr. Qtrd. Sap Gum

Stock from excellent suppliers. Delivered prices quoted. Inquiries solicited.

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NEW Tenoner

★ Simplified design ★
Combination Tenoning & Coping Heads

★ Quick set-ups ★
Heavy-duty direct-drive 3 H.P. Motors

★ Up to 9" long tenons ★

Built-in check-rail Slotter

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IMPROVED Ball Bearing Shaper Collars

Friction between collar and pattern entirely eliminated — no more burning.

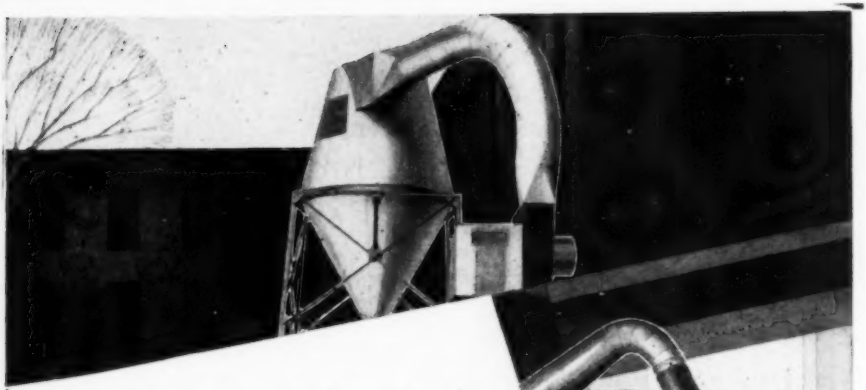
Outer rim is independent of the slotted collar and revolves with the feed of the work.

Collars can also be supplied without grooves for use with solid steel cutters.

Give diameter of collar and size of hole.

GUSTAFSON & SCOTT MFG. CO.

1637 Lowell Avenue Chicago 39, Illinois



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DUST and FUME CONTROL

Young & Bertke Dust and Fume Control systems increase efficiency of dust producing machinery, cut maintenance costs and downtime. National Sewing Machine Co., The Randall Company and Avco Mfg. Co., partners in progress . . . solved their dust collecting problems by building a web of safety around "iron men" to maintain new, high speed operations and processes. Machinery, saw and sander dust was a common problem in their respective operations . . . but varied widely. Let Young & Bertke solve your problems by writing for Brochure and information chart, today.

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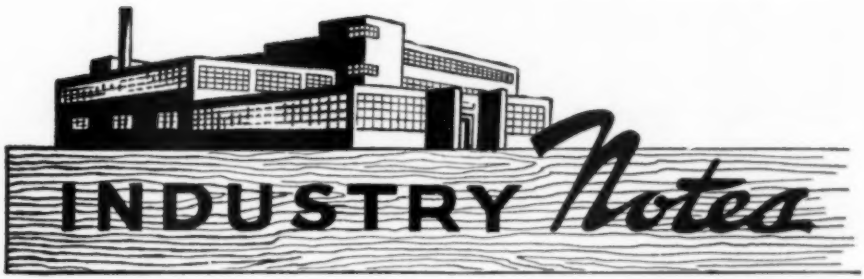


NEW PLANT FOR KOPPERS

Koppers Company, Inc., which operates 55 plants in 25 states, has announced that its wood preserving division is ready to start erection of a wood preserving plant at Horseheads, N. Y. The new plant will pressure treat railroad ties, poles, piling, farm fence posts and lumber.

TIMESAVERS MOVES

Timesavers, Inc., manufacturer of Timesavers woodworking equipment has moved its headquarters to 5270 W. Broadway, Minneapolis, Minnesota. Their plant is located in Robbinsdale, Minnesota, a suburb of Minneapolis and is set up to run actual production tests and demonstrate such machines as the Shapesander and other Timesaver equipment.

This plant will also serve as a parts replacement depot and central sales office for all Timesavers equipment. Use of the following mail address will facilitate handling of all correspondence: Timesavers, Inc., P.O. Box L, Robbinsdale 22, Minnesota.

SOUTHERN SASH & DOOR MEETING

The Southern Sash & Door Jobbers Association, headquarters in Memphis, Tenn., held its 18th annual meeting at Seattle, Washington. At the convention W. Horace Woods of Geo. C. Vaughan & Sons, Houston, Tex., was re-elected president.

James M. Green of Palmetto Sash & Door Co., Inc. of Orangeburg, S. C., was re-named vice-president, and Barney Gallagher continues as secretary-treasurer.

New directors, each elected for a three-year term, include: Carl L. Bridenthal of Scott Sash & Door Co., Inc., of Little Rock, Ark.; Jeffrey Folse of Edgar P. Folse, Inc., of New Iberia, La.; Charles E. Hughes of Southern Sash & Door Co., of Greenville, S. C.; Clarence C. Landskroener of Delmarva Sash & Door Co., Barclay, Md.; W. W. Logan, Jr. of Logan Lumber Co., Tampa, Fla.; H. H. McAlister of Nashville Sash & Door Co., Nashville, Tenn.

Marvin Miller, Miller Millwork Corporation, Charlotte, N. C.; Louis G. Riecke of Tulane Hardwood Lumber Co., Inc., New Orleans, La.; Joseph M. Rubens, Binswanger & Company, Inc., Richmond, Va.; David C. Schaefer of Central Woodwork, Inc. of Georgia, Atlanta, Ga., and Carter Wood of Maynard Sash & Door Co., Amarillo, Texas, C. L. Carmichael of Chandler & Co., Inc., Knoxville, Tenn., were named directors for a one-year term.

NATIONAL WOODEN BOX MEETS

The National Wooden Box Association held its summer meeting June 18 and 19 at the Greenbrier Hotel, White Sulphur Springs, W. Va. Sessions were held on ammunition boxes; current production and sales prospects; lumber supplies and costs; and labor developments.

The 1954 meeting will be held July 9-11, at Sun Valley, Idaho.

Towsley INDUSTRIAL FLOOR TRUCKS

for Every Materials Handling Purpose

NO. 327

The favorite truck of the woodworking and furniture industries. Hardwood body and stakes, steel tie rods used in frame, welded steel post sockets.

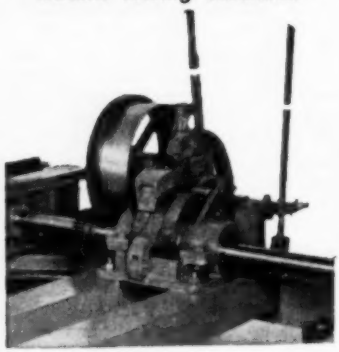
TOWSLEY TRUCKS in your plant mean greater ease in handling materials . . . greater economies.

To your specifications, your requirements, your satisfaction each Towsley Truck is engineered for versatile performance, quicker loading, smoother wheeling, easier steering, heavier pay load, greater manpower conservation.

FOR DETAILS WRITE FOR BULLETINS

TOWSLEY TRUCKS, INC.
1760 ELMORE ST., CINCINNATI 23, O.

SET FAST with ENTERPRISE Double Acting Setworks



- Will set sixteenths
- Guaranteed accuracy of 1/64 in.
- Large easy reading brass board dial
- Hardened steel pawls
- Available for use with spring or power receder

THE ENTERPRISE COMPANY
COLUMBIANA, OHIO

Appointments

Fred E. Rydberg has been appointed general sales manager for Curt G. Joa, Inc., engineers and manufacturers of Jenkins woodworking machinery and other specialized equipment. In his new responsibility Mr. Rydberg will direct Jenkins sales formerly handled by **Elmer A. Gerber.** Mr. Gerber is being transferred to the Florida Division at Lake Wales, Fla., under the "Joa Plan" of utilizing long-service employees in less strenuous activity. At Lake Wales Mr. Gerber will assist Mr. Curt G. Joa, president.

Fred E. Rydberg

Elmer A. Gerber

The Day Company, Minneapolis, announces the election of **Roy E. Gorgen,** executive vice-president; **Max R. Springer,** assistant vice-president and **Charles W. Mayfield,** secretary.

F. Richard Meyer

Walter F. Carter

The appointment of **F. Richard Meyer III** as assistant to the president of Acme Steel Company, Chicago, has been an-

nounced. Mr. Meyer replaces **Christopher D. Norton** who was elected vice-president of Acme Steel International Company and Acme Steel Overseas Co. **Walter F. Carter** is now assistant general superintendent of the company's Riverdale plant, Riverdale, Illinois.

Several changes in the technical and sales personnel on the West Coast have been announced by National Starch Products, Inc. Robert L. Burk will be sales supervisor in the Los Angeles area. **Fred T. King** will handle sales in the Pacific Northwest with headquarters in Portland. **Joseph J. Ducharme** is being transferred from the New York laboratory to the San Francisco technical service department.

J. Edgar Kennedy is new managing director of the Hardwood Dimension Manufacturers Association. He succeeds **Phillips A. Hayward** who resigned from the position on May 30. The new office address of the association in Nashville has not yet been determined.

American Wheelabrator & Equipment Corp. announces that **Robert L. Orth** is field sales manager. **Julius E. Skene** is now manager of customer service and **Philip R. Jordan** assumes the duties of chief sales engineer.

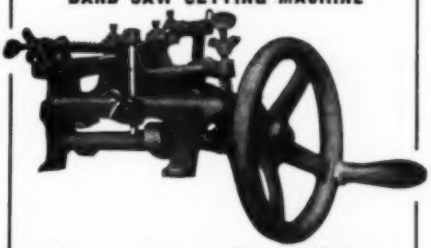
William H. Morlock has been elected president and treasurer of Baxter D. Whitney & Son, Inc., Winchendon, Mass. **Kenneth O. Brown** is now vice-president in charge of sales and **Elliott D. May**, vice-president in charge of engineering.

New vice-president of the Western Hardwood Lumber Co., Los Angeles, is **Robert M. Bodkin.**

Robert C. Whitmeyer, J. R. Quigley Co., Gloucester City, N. J. is the new president of the National Plywood Distributors' Association; first vice-president is **Mike Davidson**, Houston Sash & Door Co., Houston, Tex., and second vice-president is **Leonard E. Hall**, Lumber Products Co., Portland, Oregon.

A. H. Lundberg is general manager of U. S. Plywood Corporation's new wholesale lumber division. Headquarters will be in Portland, Oregon.

SIMPLEX
BAND SAW SETTING MACHINE



Simple yet accurate and efficient. Will do more and better work than any other machine of its kind.
The vise takes saw blades ⅛"—1½" in width and by automatically gripping the saw while tooth is being set, prevents twisting of narrow saw blades. The feed finger is adjustable to teeth with ⅛"—⅝" spacing, point to point.
All adjustments for different widths, teeth, etc. are regulated by but two thumb screws.
Best working speed 100 revolutions (200 teeth) per minute, each revolution setting two teeth. A saw can be set in 4 to 5 minutes.
The machine can be fitted with a flat or V pulley for power operation if desired.

Further Details Upon Request

ZEILLER & NAGEL, INC.
232 JAVA ST. BROOKLYN 22, N. Y.

SPEED IS ONLY ONE OF ITS **ADVANTAGES!**

SHIMER HIGH SPEED
VISE GRIP HEAD

for high speed, true-to-pattern
MATCHING, JOINTING AND
SHIPLAP PRODUCTION

6-bit model shown. Also available in 4-bit model. Designed for consistent uniformity; evenly balanced for vibration-free operation; made with a simplicity that means fewer parts to maintain. Milled to pattern bits cut evenly, wear evenly.

write or phone for prompt service . . . free catalog

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RACE STREET • MILTON, PENNA.

for a fabulous finish...

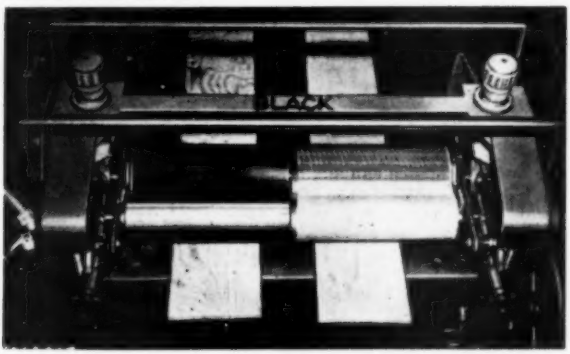
JEWEL BRAND
Abrasive Belts

Finer finishing — sanding, smoothing, polishing — for all types of wood products.

ABRASIVE PRODUCTS, INC.
551 Pearl Street **South Braintree 85, Massachusetts**

EQUIPMENT and Supplies for the WOODWORKING INDUSTRY

VERSATILE GLUE SPREADER



This glue spreader can be used for single and double coating at the same time. The machine is manufactured by Black Brothers Company, Inc., Mendota, Ill.

The picture shows a partial view of one of the No. 22-D resilient roll glue spreaders which has been arranged for single and double coating at the same time. The board on the left is being glued on the bottom only; the board on the right is being glued on the top and bottom (lower coating and doctor roll are not visible in this view).

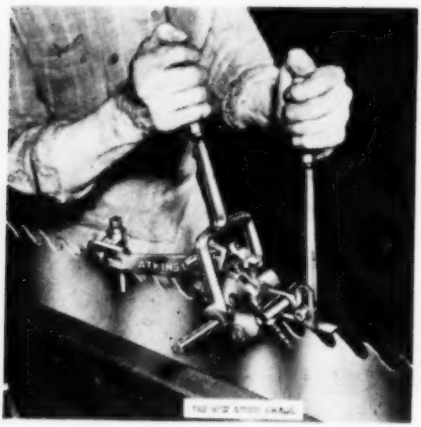
This arrangement has proved to be quite popular in gluing up laminated stock of uniform thickness where the top and bottom pieces are single coated only and the inside sandwiched laminae are double coated. A standard machine is used with a special upper coating roll and doctor roll with a dam dividing the glue reservoir. The particular machine illustrated is a No. 22-D-32 spreader with the dam in the middle. The dam can be located at any predetermined position.

Inasmuch as these spreaders have a thickness adjustment of from 0 to 4½", a wide variety of stock—from thin veneers to 2 x 4's—can be glued with these spreaders. A few of these include laminated roof trusses and rafters, telephone pole cross arms, ship keels, porch columns, 2 x 4's and larger dimensional stock.

Any of the regular optional extras, including variable speed drive, circulating pump unit and water cooled doctor rolls can be furnished on these modified spreaders.

HANCHETT ACQUIRES ATKINS' SWAGE AND SHAPER LINE

Of interest to the timber, lumber, woodworking and kindred industries, it is the recently announced purchase of the entire Atkin's swage and shaper line, by the Hanchett Manufacturing Company of Big Rapids, Michigan and Portland, Oregon.



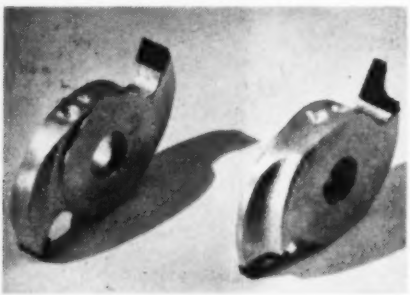
Machines as well as replacement parts will be carried in both Hanchett plants, at Big Rapids, Michigan and at Portland, Oregon. Dealers in practically every state in the union will also carry complete stocks of swages and shapers for prompt service to users. The purchase of this former Division of Borg-Warner Corporation of Indianapolis, Indiana, includes all machinery, such as milling machines, screw machines, die grinders, drill presses, as well as drawings, patterns, jigs and fixtures, together with a tremendous stock of replacement parts used by Atkins in manufacturing and servicing these precision tools.

Hanchett thus becomes one of the largest manufacturers of this important type of equipment so necessary for complete saw-tooth conditioning. An entirely new and complete separate division will be set up at the Hanchett plant, for the manufacturing of these swages and shapers.

DOOR LIP CUTTERS

Fully balanced door lip cutters cast of a special heavy metal formula that reduces the whip inherent in such cutting tools to a microscopic variance now are being marketed by Price & Rutzebeck, West Coast distributing firm.

Key to the new tool's reduced whip is a ductile iron formula which permits new design changes giving unusually rigid support to the carbide tips.



A distinctive copper color identifies the O.C.E. cutters, which Price & Rutzebeck plans to place in immediate national distribution through regular trade channels. Information may be obtained from the firm at 22150 Meekland Avenue, Hayward 50, Calif.

RESISTANT SURFACE MATERIAL

A new surfacing material highly resistant to abrasives, heat and chemicals, and combined with the weight advantage and mechanical properties of wood, is now being offered. Developed through the combined efforts of the research laboratories of Gamble Brothers of Louisville, Ky., and the U.S. Rubber

Co., this material will be available under the trade name of Gam-En-Wood.

Gam-En-Wood employs U.S. Rubber Company's new thermosetting plastic, Enrup, as a surface material molded over properly selected, cured and machined Gamble Brothers' hardwood parts. Uses for the material are almost fantastic. It can be used for laboratory table tops, flooring, baffles, conveyor rolls and slats, electrical panels, tank linings, railroad crossing planks and countless others.

Gamble Brothers, Louisville 2, Ky., is one of the few concerns in the woodworking field which maintains laboratory facilities and highly trained personnel in engineering of wood.

SWING SAWS

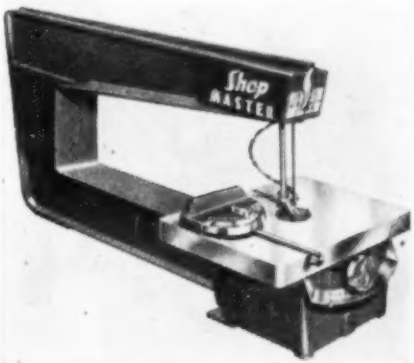
Heston & Anderson, Fairfield, Iowa, has added a new model to its line of swing cutoff saws and has redesigned its smallest model. According to the company, "This has been done in order to satisfy all the requirements we have found among users."

Shown in the photograph, left to right, are the following machines: the No. 55, with 16" or 18" blade; No. 25, with 14" blade; the new model No. 15, with 12" blade; the redesigned No. 5, 10" bench model which is also available as a floor model.

Heston & Anderson's automatic air operating unit may be used with all models. The company regards this unit as the answer to maximum speed, and points out that in recent tests up to 77 strokes per minute were reached in cutting 6" to 12" core blocks.

20" JIG SAW

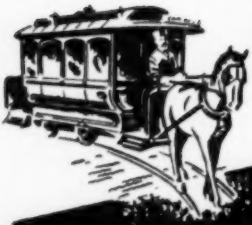
A new 20" jig saw with self-contained motor has been developed by Shopmaster, Inc., of Minneapolis, Minn.,



manufacturers of woodworking power tools. It does not contain the conventional solenoid or vibrator power, but full-rotating armature AC motor built-in. It plugs into any 110-volt AC outlet.

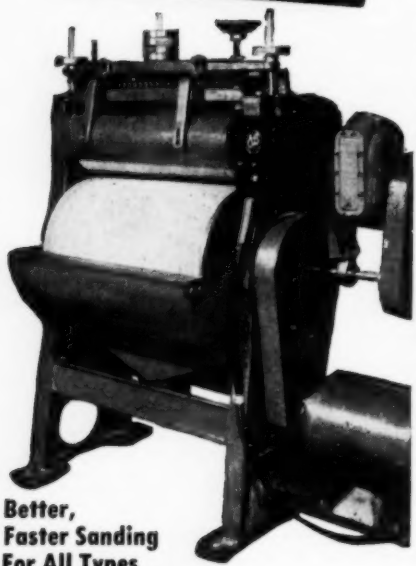
The jig saw cuts up to 2½" stock, cross-cuts, rips, cuts compound angles and cuts to center of 40" board. The 10"x12" table tilts a full 45°. There is no need to disassemble and reassemble when changing from cross-cutting to ripping. Head is turned to 90° and it is ready for ripping.

Other features include Shopmaster's exclusive combination miter gauge and rip fence (an accessory available at slight extra cost) and new Master-View controls that take the squat and stoop out of setting controls accurately. All calibrations may be easily read from



YOU WOULDN'T RIDE ON TRANSPORTATION LIKE THIS . . .

WHY BE
OLD FASHIONED
ABOUT SANDING? . . . USE A
TIMESAVER
SHAPESANDER



Better, Faster Sanding For All Types of Serpentine, Curved and Straight Wood Stock

Eliminate costly hand sanding operations and obtain top production and quality finishes with a SHAPE-SANDER. Handles stock up to 24" wide and 2" thick with a production capacity limited only by the ability of the operator. Check on this amazing machine for your shop, today.

Write for Circular and Prices.

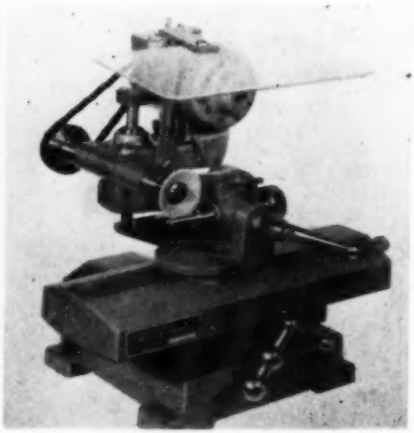
TIMESAVERS, INC.

P. O. Box L
Robbinsdale 22, Minn.

standing position. A new shoe hold-down and built-in blower contribute greatly to clean, precision woodworking.

ROUTER BIT GRINDER

This router bit grinder, manufactured by the William H. Field Co., 323 Dorchester Ave., Boston 27, Mass., is a new machine for sharpening straight or tapered flute router bits, dovetail bits, three lip shaper cutters and similar tools. Its primary purpose is to eliminate free hand grinding in all sharpening operations. The functions and movements of the machine are entirely mechanical.

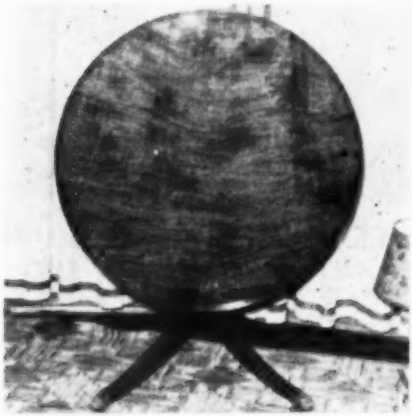


Grinding is done on the cutting face of the flute, retaining the original shape and diameter of the bit—not on the periphery which would change the dimensions with each resharpening. The points are sharpened by swiveling the work head to the desired angle or compound angle.

An interesting feature of construction is the carriage which has a 4" movement on ball bearings rolling in hardened, ground and lapped raceways, almost without deflection and practically effortlessly, it is said.

MAHOGANY TABLE TOP

This table top is 41" in diameter and is made of one solid piece of Honduras mahogany. It was cut from a huge root spur. There is probably no other table



like this one in existence. It has been appraised as being worth $2400 and certainly could not be duplicated.

RESINOX 743

Availability of a new phenolic resin combining the two properties most sought after in a binder for granulated wood—high flow and fast cure—was announced today by Monsanto Chemical Company's Plastics Division, Springfield, Mass.

The new product, Resinox 743, converts sawdust and other wood wastes into important new raw materials for the manufacture of furniture, toys and housewares. During the past several months it has been used successfully in the mass production of a wide variety of such items.

Finely divided and non-lumping, Resinox 743 is characterized by its high flow which is evident even at the initial application of heat and pressure. This allows a deep penetration of the wood mass, a particularly important advantage when heavy cross sections are involved.

Starrett
"Skip-Tooth"
BAND SAW BLADES

- Cut Faster and Cleaner
- Cut Any Material
- Outlast All Other Blades

Because it holds its keen cutting edge until the teeth are completely worn out, one Starrett "Skip-Tooth" outlasts several ordinary blades. There's no resharpening expense, less blade changing. Cuts any wood, plastic, fibre or wood substitute better, faster, cleaner. Try one and you'll never go back to ordinary blades.

Regular Wood Band Saws
Also Available
Write for Bulletin "WW"

Buy Through
Your Distributor

Starrett

THE L. S. STARRETT COMPANY · ATHOL, MASS., U.S.A.

Fast cure is another important advantage exhibited by the new Monsanto resin. This makes possible all of the economies inherent to shorter production cycles.

In addition, bits of granulated wood bonded together with Resinox 743 consistently have demonstrated good strength properties, good screw-holding power and high resistance to water.

SHELTER HOUSES OF TREATED WOOD

Koppers Wood Preserving plant at Orrville, Ohio, prefabricated five shelter houses recently for the Oakmont golf course. These houses are 12' x 12' and are of mixed oak. For permanence, the cut-to-size pieces were placed in a pressure cylinder and given a treatment to make the wood resistant to attack by fungus, termites and weathering. It is estimated that these shelter houses will last about 30 years with a minimum of repair.

Shelter houses of this sort open a new field for additional uses of treated wood. Long life prefabricated buildings of this type can be used in parks, as bus shelters, refreshment stands, etc.

NEW TACKER

The Fastener Corp., 860 Fletcher St., Chicago, tells us that as a result of de-

TUNGSTEN TEMPER

HIGH SPEED THIN KNIVES

Stalter High Quality of workmanship and material is always reflected in increased production with less "down-time."

PROMPT DELIVERY

High speed thin knives are just one of the many Stalter products for the woodworking plant. For complete details,

WRITE FOR FREE CATALOGUE

STALTER EDGE TOOL COMPANY

GRAND RAPIDS MICHIGAN

mands from the furniture and woodworking industries, the firm is now marketing a new air tacker to drive a long, heavy 9/16" narrow crown staple.

The machine is the Duo-fast direct drive air tacker. This machine, called model DN-5418, will also drive a similar ½" staple.

NEW SANDING SEALER

A new sanding sealer for use as a first coat on most common woods that are to be finished with Platon has just been announced by Minnesota Platon Corporation, Pipestone, Minnesota.

In addition to sealing the wood, this new Platon sanding sealer also acts as a filler. It is claimed that the open cells of the wood are filled so that after the wood is resanded lightly it has a uniformly dense surface. Succeeding applications of Platon then build up more rapidly to produce a better finish with fewer coats.

HEAVY DUTY BOX STITCHERS

A new heavy duty duplex-head box stitcher designed for continuous high speed stapling of large corrugated and solid fibre cartons has been announced by Bostitch, Westerly, R. I. The machine drives and clinches two staples

THE IMPORTED, BRITISH CHAIN MORTISE GEAR

Manufactured by Monk, Worsley & Monk, Ltd. Rockport, England

COSTS LESS TO BUY ...LASTS LONGER

COSTS LESS TO USE!

OUR TOOLS D O K OR WE DO

We have an imported British Mortise Chain for every type and size mortise you require, in our stock in Houston, Texas. And, all these bars, chains and sprockets can be used with your present equipment! What's more, through an exclusive patented feature, the removal of only one screw enables you to fit a whole new bearing instantly . . . no skill required!

Phone, Write, or Wire Today for Catalog and Complete Price List at No Obligation.

DERBY-KING, Inc.

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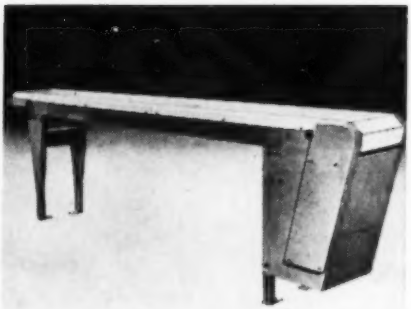
2½" apart with each stroke and has rated speed of 250 strokes per minute. A throat depth of 25" makes it possible to staple containers up to four feet wide and the duplex head cuts the required number of strokes in half.

With its high speed of operation and large throat capacity, this new Bostich stitcher is especially well suited to the needs of high volume producers who must have a speedy secure fastening and yet maintain low costs in their carton closing operations.



ARMORBELT CONVEYORS

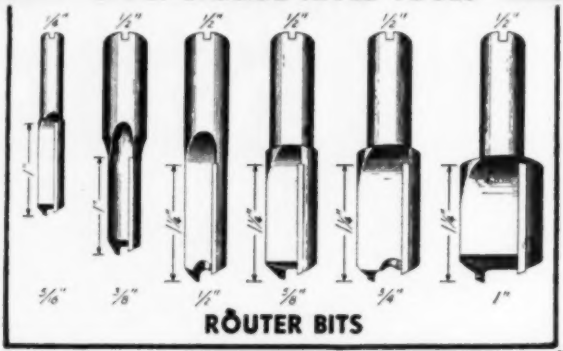
Armorbelt is a new development in metal belt conveyors made by the M-H Standard Company, 513 Communipaw Ave., Jersey City, N. J. This conveyor can carry loads ranging from a few ounces up to 16 tons and will resist wear, heat, cold, high impact, etc.

The manufacturer says that the individual metal link construction eliminates belt tracking problems. Cases, crates, etc., can be pulled off or pushed onto the Armorbelt from the sides without damage to the belt. The conveyor becomes a production line by bolting or welding jigs and fixtures to the steel belt links.

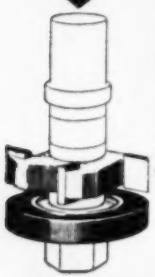
Horizontal conveyors are furnished for both standard and heavy duty applications in widths from 6" to 120" and lengths up to 200'. The belt joints do not use pins. Therefore tools are not

O.C.E. CARBIDE TIPPED TOOLS

PLASTIC TRIMMERS



PLASTIC TRIMMERS



Dealers in Principal Cities
For Further Details Write to

PRICE & RUTZEBECK

P.O. BOX 30
HAYWARD, CALIF.

required for assembly and there is nothing to force or lock.

Accessories such as side leaves, side tables, cleats, vertical bends, diverters, corner rollers, gravity spurs are available and add to the versatility of Armorbelt.

PLASTIC SHEETS FOR FURNITURE

Beauty and color, plus long lasting, carefree service in vertical as well as horizontal surfaces, are now available in Nevamar, a high pressure laminate made by the National Plastic Products Company of Odenton, Maryland. It is equally adaptable to a large building project—commercial or residential, to a remodeling job, or for the hobbyist who likes to do small jobs about the house or to build furniture.

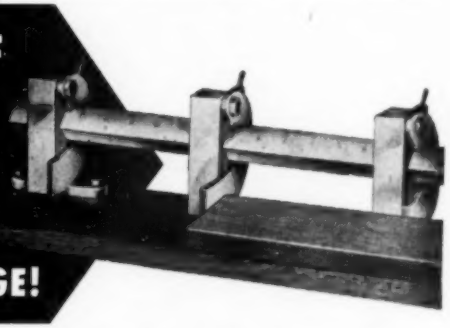
The decorative quality of these laminated plastic sheets and their tough, hard and non-porous surfaces make them ideal for many applications. They are adaptable to many furniture uses, such as cocktail and coffee table tops, desk tops, dinette and dining table tops, and for any other surface that needs to withstand hard use.

The range of colors and patterns permits the development of many pleasing color schemes. For example, kitchen units can be surfaced vertically with knotty pine, while the horizontal or top surface can be any one of a number of solid colors. Among the other attractive wood grains being made are straight-grain oak, maple and mahogany in both bleached and stained colors as well as natural finishes. In addition, there is a good choice of solid color and novelty patterns, including a linen crash design in several colors.

HEAVY DUTY ELECTRIC SAW

A new 8¼" portable electric saw with a number of patented improvements has just been introduced by the Porter-Cable Machine Co., Syracuse, N.Y. The

Increase CUT-OFF SAW Production
WITH A
COMET
ADJUSTABLE STOP GAUGE!



COMET Stop Gauges are faster because: Stops can be positioned anywhere on the bar by hand. Additional stops can be added to the bar without dismounting it. Balanced stop trigger swings easily out of way when not in use.

COMET Stop Gauges are more accurate because: Cold rolled steel bar is engraved in ⅛" steps and can not be marred by stop clamps. Machined stop trigger is set to mark—no guess-work on rough stop castings. Work forces stop trigger against block (not away) for perfect alignment.

COMET Adjustable Stop Gauges are available in lengths from 8 to 20 ft. All parts are heavily plated against corrosion. Can be used on right or left hand installations. Price of 8 ft. bar with four stops: $34.00, F.O.B. Los Angeles.

Write for complete details to Dept. H-3.

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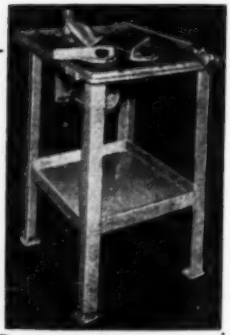


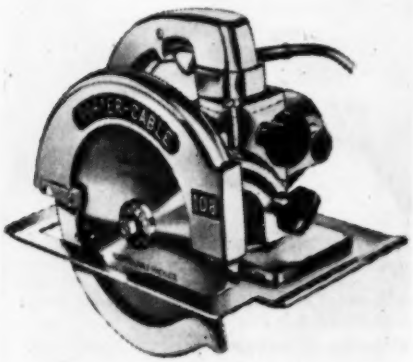
New
TILTING
ARBOR
SAW

The H&A *King of Quality*

The new 8-inch Tilting Arbor Saw by H & A is truly "The King of Quality!" Heavy cast iron table. Life sealed ball bearings. Motor that tilts with the saw - to assure complete alignment of parts at all times. Here's a saw that is built for continuous use all day long, every day! It's the choice of woodworkers who insist upon quality. WRITE TODAY! Write for FREE literature, name of nearest authorized dealer.

HESTON & ANDERSON
Division of ST. PAUL FOUNDRY & MFG. CO.
11-15D FAIRFIELD, IOWA

model, No. 108, has four exclusive safety features: a telescoping guard designed to prevent catching as the saw proceeds through wood; a finger lever at rear of



guard to enable the operator to uncover the blade without danger when making pocket cuts; an auxiliary guard which automatically covers the front teeth at any depth; and a built-in kickproof clutch that completely eliminates dangerous bucking if saw hits an obstruction or binds in the wood.

Porter-Cable says that this saw can cross-cut a 1" x 10" plank in one-half second. It weighs 13½ lb. and has a center-balanced loop handle and trigger switch. The saw will cut 3" dressed lumber at maximum depth and 2⅛" deep at a 45° bevel. A 40 page book of tips on uses of the saw is included with each machine.

DELTA OFFERS NEW CARBIDE-TIPPED BLADES FOR RADIAL SAWS

A new line of low-cost carbide-tipped saw blades designed especially for use with radial saws will reduce machine downtime and eliminate many common blade problems, in a number of industrial cutting operations, according to the manufacturer.

Introduced by the Delta Power Tool Division of the Rockwell Manufacturing Company, these carbide-tipped blades are the first to be mass-produced. The new carbide-tipped blades are said to be particularly well-suited for use in crating and similar operations in shipping rooms and for use on cut-off saws in furniture plants and pattern shops.

The carbide tips are precision-brazed to blades of special-analysis, high-quality tool steel, then diamond-wheel ground to close tolerances. Clearances are precision ground on the sides of the teeth with diamond wheels, eliminating setting or swaging of the teeth.

Because of this built-in swage design, only the carbide cutting edges touch the work, reducing friction and power loss, and also reducing the danger of kick-back making faster, smoother cutting possible.

The blades are offered in 10", 12" and 14" diameters to fit standard arbors and in 24, 30, and 36-tooth types respectively, after careful research to determine the best type of blades for radial saws. The blades are ideally suited for use with power feed attachments.

SAWDUST BURNERS

Bulletin No. 37 is available from the Rees Blow Pipe Mfg. Co., 340 Seventh St., San Francisco, Calif. The brochure illustrates both single and double wall burners. Rees double wall burners are designed for fast and safe burning of sawdust and shavings. They are especially made for remanufacturing plants with daily capacity—eight hour shift—of from 25,000 to 400,000 board feet.

Single wall sawmill burners are designed primarily for handling sawdust and slabs. They can best be used by mills with daily runs from 10,000 to 180,000 board feet daily. All burners are prefabricated to exact dimensions.

WOOD TRUCK BODIES

A structural material for motor truck bodies, combining the strength and durability of metal and cross-grained woods, now offers economies in both original and operational costs of trucks.

This material—Armorply, product of United States Plywood Corporation—offers greater rigidity, less vibration and reduces weight in the finished truck body.

Armorply is a laminate, with a metal facing bonded to one or both sides of a plywood core. While almost any metal of almost any thickness, can successfully be used for this facing, aluminum, zinc-coated steel or stainless steel are generally employed. The usual thickness of the metal is approximately 0.025" or about 24 gauge, although it can be thicker or thinner. Core material is generally ¼", ⅜", ½" or ¾" Weldwood fir plywood, but other thicknesses or even other materials have been used.

"These Armorply panels," says Samuel F. Gussen, general manager of Lewisohn Sales Company of North Bergen, New Jersey, one of the largest suppliers for truck body builders in the East, "have proved under test to be one of the most formidable body components in the market today."

KILN CLINIC

A 6-day clinic for training of kiln operators in modern lumber drying methods will be held September 14-19, 1953, at the University of Massachusetts, Amherst, Mass., in cooperation with seasoning specialists of the U. S. Forest Products Laboratory.

Firms wishing to enroll working kiln operators, plant foremen and superintendents, and company officials in the clinic can obtain application blanks for enrollment by writing the director of the laboratory at Madison, Wis. The enrollment fee is $100 per person.

The clinic is one of a series of sessions in the kiln drying of lumber held in many parts of the United States since the end of World War II. More than 700 men have enrolled in them for instruction in up-to-date operation of kilns for fast, safe drying of wood.

Manufacturers of practically all types of wood products have enrolled employees in these clinics and demonstrations. The instruction has proved especially popular with makers of furniture, millwork, flooring and other products requiring seasoning of lumber for best serviceability.

Among subjects to be discussed at the clinic are new, fast drying schedules for dry kilns, operation of dry kilns, instruments used to control heat and humidity in the kilns, practical discussions of how wood dries and what happens to it as the water leaves, and methods of checking on the drying rate and condition of the wood at various stages of the drying process. The laboratory's research has pioneered developments in all these fields.

SOUTHERN WOOD PRODUCTS CORP.

The two plants of the Southern Wood Products Corp. which were located at Ackerman and Maben, Mississippi have been discontinued. They are now consolidated in the firm's new plant at Fulton, Miss. The new plant has a capacity double that of the two former plants.

WORKER-OWNED PLYWOOD COMPANY ANNOUNCES VOLUME PRODUCTION OF NEW HIGH-STRENGTH HARDBOARD

Volume production of a new high-strength hardboard panel with extreme flexibility was begun in the fall of 1952 by Anacortes Veneer, Inc., one of the largest worker-owned plywood firms in the Pacific Northwest.

Manufactured in the firm's new $1,000,000 push-button hardboard plant at Anacortes, Wash., Armorbord is light tan with a hard, satiny surface ideal for painting and highly resistant to wear. It is now being used for a wide range of jobs—fixtures and displays, toys, instrument boards, packaging and the host of other applications to which hardboard is adaptable.

Armorbord is made in 1/8", 3/16" and 1/4" thicknesses. The board is said to be so flexible that a strip of board 1/8" thick can be bent into a tight circle about the size of a hatband without cracking the surface. The board's resistance to impact makes it usable for punishing jobs, such as crating. Its high flexibility means it will be ideal wherever curved surfaces are required—from display fixtures to concrete forms.

Also suitable for established applications in the building field, like underlayment for floors, wall paneling and cabinet work, Armorbord in the 1/4" thickness is highly stable under changing moisture conditions and its physical properties exceed all minimum government specifications for standard hardboard, we are told.

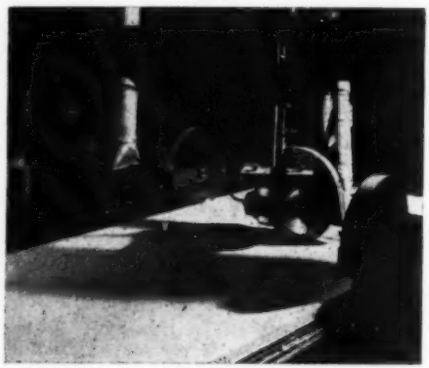
The new hardboard is made solely from solid old growth Douglas fir which accumulates in various forms in the plywood plant. This material includes log centers which remain after the logs have been "peeled" and solid veneer trimmings which cannot be used for plywood.

These are chipped into small pieces of wood about the size of a man's thumbnail (they average 5/8" square). Then, after softening by steam, they are mechanically ground into tiny wood fiber bundles with brushed-out ends.

After blending with a small amount of resins and other additives, the fibers appear on a moving belt in the form of a deep, spongy blanket which is subsequently hot-pressed into the final product.

Because of the non-directional pattern of the fibers in the blanket or "felt" prior to pressing, they are bent over in the press forming tens of thousands of microscopic interlocking trusses. These in turn give the board its high elasticity and its unusually high impact resistance.

The entire process is automatic to this point. The only hand labor involved is that of feeding and unloading from trim saws and careful, systematic grading.



Board can be cut to exact dimensions.

In the Anacortes production setup, veneer trimmings are chipped with a 66" Sumner chipper which is fed from the green end. Core blocks are chipped in a 112", four-knife, 250 h.p. Sumner.

Chips from both sources are screened on a Sumner screener in a separate operation to an average size of 5/8" and then fed into chip storage bins. There are six bins capable of holding 1,000,000 pounds of green fir chips.

No outside sources for chips are contemplated at this time. Despite this, there are ample leftovers from the plywood operation to fuel the main power plant except for occasional fluctuations in seasonal fuel requirements. These are met by supplementing hog fuel with small amounts of fuel oil.

The Anacortes plant is a 50-ton mill employing a continuous Grenco cooker. Metered chips are fed into a rotary barrel-type valve which feeds the main tube of the cooker by a series of adjustable paddles set at right angles to the axis.

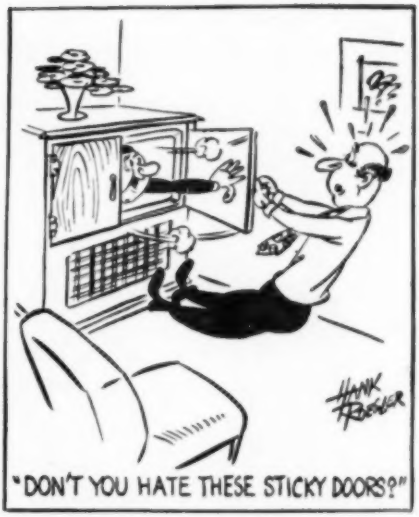
The out-feed end of the cooker is controlled by another rotary or barrel-type valve. Steam pressures from 20 to 50 p.s.i. and retention times from 5 to 20 minutes are used for softening the chips. The system provides for a continuous even flow of material to two Bauer grinders at a uniform controlled temperature. The chips are discharged from the cooker outlet valve into a bulk flow conveyor and screw conveyors from the bulk flow meter the chips into each grinder.

Wax size is added to the fiber during processing and a small amount of thermo-setting resin is mixed into the material in a Grenco blender after grinding.

Upon being discharged from the blender, the fibers are picked up in an air stream by a blower and discharged into a cyclone for air separation with the fibers being fed directly to the felting machine.

The felting machine is a special design in which the fibers are fed by chute to a high speed rotor in the felter and distributed by it to the top of the felter chamber. The fibers fall to the floor of the felter giving much the effect of a very heavy, gentle snow storm.

The floor of the felter is a moving belt synchronized with the output of the grinders. As the mat emerges from the felter, it is 6" thick. A Link Belt pre-compressor brings it down to about three inches before the mat is cut to desired lengths by a traveling saw.



The press is a conventional 20-opening Lake Erie hardboard press except for a greater daylight opening between plates. The mats are received on a conveyor type wire cloth which carries them onto the press plates. Following curing time, which runs from 8 to 12 minutes, the sheets are ejected from the press by means of the wire cloth which remains under the mat during pressing to facilitate venting of moisture.

Moisture content of the board is brought up to 5 to 7 per cent in a conventional tunnel type humidifier. The panels are then graded by hand before packaging for shipment.

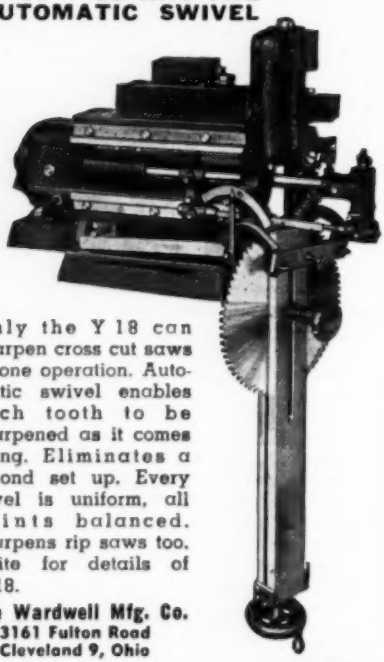
Consider the whale. The only times he gets into trouble is when he stops swimming to blow.

ELECTRONIC GLUING

Because of popular demand, we have reprinted the series of articles by Paul Graham on Electronic Gluing—a Survey of Applications. This 96-page booklet is available for $1.00. Write, the editor, WOOD WORKING DIGEST, 222 E. Willow, Wheaton, Ill.

Sharpens, bevels each tooth as it comes along

ONLY Y 18 HAS THE AUTOMATIC SWIVEL



Only the Y 18 can sharpen cross cut saws in one operation. Automatic swivel enables each tooth to be sharpened as it comes along. Eliminates a second set up. Every bevel is uniform, all points balanced. Sharpens rip saws too. Write for details of Y 18.

The Wardwell Mfg. Co.
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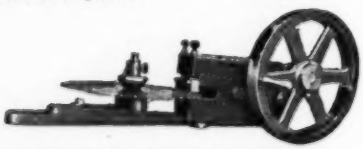

AC 38 CIRCULAR SAW SETTER

Sets teeth at a speed of 150 to 200 per minute on saws with diameters from 5" to 38".

WARDWELL

Maker of largest line of saw and tool sharpening machines

District Managers

WOOD WORKING DIGEST

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WOOD WORKING DIGEST

AUG. 1953

READER'S SERVICE DIVISION

This insert (please note all four cards) is designed to help you obtain woodworking information. Any of these cards mailed to our Service Division will receive careful attention. There is also a form within the book for shop problems, used machinery, etc. Let us know when we may be of service to you. No obligation.

Please send information on PRODUCTS and SUPPLIES described on the following pages:

....

....

Name..... **Position**.....

Company .....

Street .....

City..... **Zone**..... **State**.....

PRODUCT INFORMATION

A quick, free way to obtain information about the equipment and supplies you need to buy.

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- Adhesives, animal
- Adhesives, casein
- Adhesives, phenolic
- Adhesives, resin
- Adhesives, resorcinol
- Adhesives, urea
- Air Compressors
- Band Saw Tires
- Bits, auger
- Bits, dowel
- Bits, router
- Bleaches
- Belts
- Boring Machines
- Car Pullers
- Chisels
- Clamp Carriers
- Clamps
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- Drill Presses
- Drills
- Dry Kilns
- Dryers
- Dust Collecting Equipment
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- Fasteners
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- Grooves
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- High Frequency Heating Equipment
- Hogs
- Jointers
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- Knives, planer
- Knives, shaper
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- Lumber
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- Machines, box & crate
- Machines, carving
- Machines, clamping
- Machines, door and sash
- Machines, dovetailing
- Machines, dowel
- Machines, filing & sharpening
- Machines, gluing
- Machines, mortising
- Machines, nailing
- Machines, sawmill
- Machines, saw setting
- Machines, screw driving
- Machines, stapling
- Matchers
- Moisture Meters
- Mortise chains
- Nailers
- Nails
- Packaging Material
- Paint
- Planers
- Planes
- Plywood
- Presses, plywood
- Putty
- Repairs, band
- Rippers
- Routers
- Safety Clothing
- Sanders, automatic stroke
- Sanders, belt
- Sanders, contour
- Sanders, disc
- Sanders, drum
- Sanders, endless bed
- Sanders, portable electric
- Sanders, special
- Sanders, variety
- Sandpaper
- Saws, arbor
- Saws, band
- Saws, chain
- Saws, cross-cut
- Saws, cut-off
- Saws, gang
- Saws, portable electric
- Saws, radial
- Saws, rip
- Saw blades, band
- Saw blades, carbide
- Saw blades, circular
- Saw Guides
- Screws
- Shapers
- Shaper Collars
- Spray Equipment
- Stackers, lumber
- Surfacers
- Tackers
- Tenoners
- Transfer Cars
- Trucks, dry kiln
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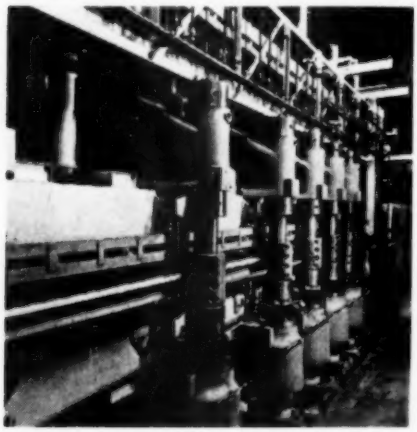
BARTREV PRESS

The Bartrev Press, designed to produce high quality panels from wood materials and other fiber wastes on a continuous basis, is 131′ long, 20′ high, 7½′ wide and weighs approximately 200 tons. Completely automatic in its operation, the press has as its component parts a hopper, a feeder, two continuous stainless steel bands each 50″



Technician (at right) examines pressure zone of the Bartrev press. The 131′ long, 200 ton machine, requiring only three men to operate, has an annual production of about 30,000,000 square feet.

wide, a radio frequency heating unit, devices for carrying materials to be laminated to the finished board and an automatic trimmer and cutter.

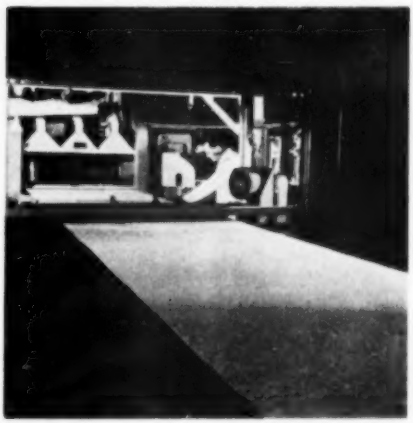
In addition to the press itself, the complete Bartrev process requires a materials preparation plant normally consisting of (depending on the raw material used) storage bins, driers, grinders, classifiers, mixers, feeders and measuring devices to maintain a flow of uniformly sized fiber particles. Also included are resin measuring and blending units to provide a stock uniformly loaded with resin.

The raw material of the process, wood, begasse, flax shives, etc., includes a wide variety of heterogeneous materials differing in such properties as density, moisture content, shape, size, etc. The raw material plant, designed to cope with one or more kinds of raw materials, prepares stock for the continuous process of the Bartrev press.

Moisture content which plays an important role in the entire concept of the Bartrev process is carefully controlled. The preparation plant is equipped with an air drier, capable of drying soaking wet particles in less than one minute.

Quality control, maintained in all phases of the process, allows only uniform wood particles to pass through the vibrating screens to storage bins. At this point the material is automatically weighed and fed, properly proportioned, into mixers where particles are blended with resins.

The Bartrev Press, which consumes up to three tons of raw material per hour, has a special feeder which lays a uniform carpet of the resin-treated stock onto an endless stainless steel belt where it is first pre-heated electronically. The material is then pressed until the resin has set by applying the desired heat and pressures to the stainless steel belts through an endless chain of platens. The result is a board of predetermined density and caliper.



Delivery end of the Bartrev press. Endless, 4′ wide, ¼″ strip emerges at a speed of 20 f.p.m.

MAX. 16" & 20" DISC SANDERS

Rugged, Dependable Lowest Priced

16" Model Complete with ½ HP 1 ph. motor, switch and cord $228.33

20" Model Complete with 1 HP 3 ph. motor, switch and cord $388.61

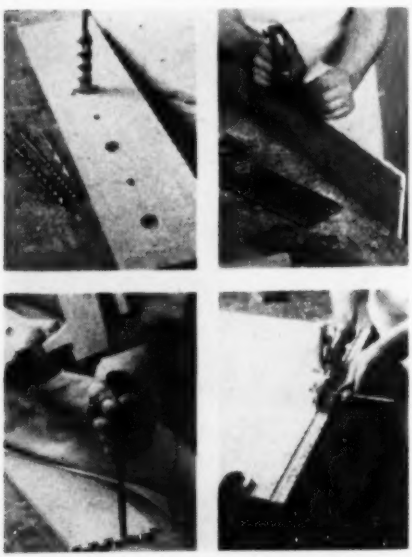
Unsurpassed for surfacing wood, metal, plastic, etc.

30" Model coming up.

Send for free descriptive literature. Dealer inquiries invited.

MAX MANUFACTURING CO.
138 Stockton Ave. San Jose 26, Calif.

Bartrev board, the product of the press, is a flat, rigid, smooth, uniform panel made from particles bonded under heat and continuous pressure. It is continuous in length. (In one day, when the press was still being tested, it turned out a single panel over five miles long.) Width of the board is 48" and thickness 3/16" to ¾". The board can be worked with ordinary hand or power-driven woodworking tools. It can be glued easily and takes a good finish. It can be veneered and laminated to fabric, metal, paper, etc.



Bartrev board is easily drilled, planed, etc., with ordinary woodworking tools.

The Aries Fiberboard Corp., 400 Madison Ave., New York, is handling the press here in the United States. The press was designed by W. J. Fischbein, British industrialist, and a 14 year research and development period was undertaken in England.

One of the most striking things about this press is the fact that it converts wood and wood wastes into high quality all-wood panels on a continuous basis.

ROUTER-SHAPER KIT

Stanley Electric Tools, New Britain, Conn., announces an addition to its new Handyman line of portable electric tools, the H40 router and the H26 shaper kit with a complete line of bits and cutters to be used with these tools. The H40 router is a basic tool for the small workshop.

Easily handled, it does all types of work in wood or plastic—rabbet and dado cuts, grooves for inlays, decorative edges, and template work. Router has micrometer depth adjustment and locking device, sealed type ball bearing motor which operates at 18,000 r.p.m. from any light socket, and cuts equally well with or across the grain. It has a full polish finish.

The motor unit for the H40 router may also be used in the H26 shaper kit to provide the user with an inexpensive and accurate bench shaper. Shaper has a patented tilting feature which makes it possible to use small cutters to produce molding and decorative cuts that could not be produced except with special cutters of twice the diameter. This kit consists of one shaper plate, one fence and guard and one arbor for mounting the cutters to the motor. To insure that the above units work at top efficiency, Stanley Electric Tools has produced a complete line of

"Hi-Hone" bits and cutters. These cutters and bits are made of high speed steel and are carefully ground and honed to insure faster, smoother cutting and longer life.

FAIRBANKS BOOKLET

Available now is a new illustrated brochure on the complete line of casters and wheels manufactured by the Fairbanks Company, 393 Lafayette St., New York City.

It features the company's innovation in caster design, the "Lockweld" caster without a king-pin. Single and double ball race swivel casters incorporating this unique construction are detailed in photos and description.

Also shown is their just marketed line of new heavy-duty steel casters available in double race swivel and matching rigid type. The circular includes data on vulcanized rubber-tired roller bearing wheels, manufactured in sizes ranging from 3" to 18".

HARDBOARD PLANT FOR JAPAN

A Chapman process hardboard plant is slated for installation in Japan by the end of 1953. Built for Mitsui Lumber, Ltd., at Nagoya, Japan, the new plant will utilize the hardboard process developed by Ralph Chapman and now used in the United States, Italy, and Canada. Mater Machine Works, Corvallis, Oregon is manufacturing the hardboard forming machinery for the new plant.

The Chapman process is a wet batch hardboard process which differs from the conventional wet batch process in the method of forming the mat before pressing. It uses softwoods or hardwoods—waste from veneer plants and sawmills, slabs and edging, with or without bark, and mill trims.

The forming equipment to form the board ready for hot pressing consists of: a white water tower for metering; a deckle box with agitator and sprays; a swing spout assembly; a cold press hydraulically operated; an inspection station and forming chain assembly.

SLASH TOOL COSTS—SPEED PRODUCTION

With VELEPEC Carbide-Tipped Router Bits, Grooving Saws, Shaper Knives, Four Wing Shaper Cutters, etc. for every conceivable shape. Stay sharp 10 to 30 times longer than regular steel tools. They stay sharper, cut cleaner and faster with smoother finishes. Effect tremendous savings in machine "reset" time and sanding operations.

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HARDWOOD PLYWOOD EXPANSION

Recently, the group of hardwood plywood manufacturers, known as the Southern Plywood Manufacturers Association, with headquarters in Atlanta, Georgia, voted to merge into one body with the Hardwood Plywood Institute.

"The expanded Hardwood Plywood Institute," said R. D. Behm, speaking at the National Plywood Distributors Association, "whose headquarters are at 600 S. Michigan Avenue, Chicago, with a branch office and laboratory at Atlanta, are setting up a militant organization to assist all channels of distribution in furthering the uses for hardwood plywoods. Represented are leading firms with mills in every section of the country. This diversification of facilities, with the advantages of prompt shipment and lower freight costs to the point of use is an important factor that makes for consistent service and stability of value which are, in turn, essential to good distribution practices."

Mr. Behm who has recently been appointed director of trade promotion for the Hardwood Plywood Institute also said that in the last 15 years the hardwood plywood industry has made great strides in improving and perfecting manufacturing techniques. Of the 117 mills making commercial types, a large portion now have hot plate presses capable of making water-proof or Type I plywoods. Improved adhesives of both the cold press and hot press operations have made the quality control program an actuality. Government agencies have recognized the integrity of the product and have specified it for such tough and exacting uses as assault boats. While there has been no fanfare and publicity, the terrific task of improving basic quality—the first step in any trade promotion program—has, in a very large measure, been accomplished.

The second step, now being promulgated, is simplified marking for the primary volume products, with identification under the Quality HPI brand. It was pointed out that a wide selection of specialized types and species are available from individual mills but that six principal volume woods in a few veneer figure types comprise the biggest field for development at the retail and manufacturing levels.

Specific goals which are getting initial attention, according to Behm, include:

1. To fortify product acceptance in a highly competitive field by selling the advantages of genuine wood converted into plywood for life-time beauty and greater usefulness.

2. To recapture markets invaded by alternate products, metals and plastics with synthetic grain which imitate natural wood grains.

3. To educate the home market, including both new construction and modernization, to a greater acceptance and an expanded use of hardwood plywoods.

ADJUSTABLE SLIP-TYPE CLUTCHES

A new line of adjustable torque-limiting clutches that provide overload protection for machine drives in a wide variety of equipment is announced by Morse Chain Company, 7601 Central Avenue, Detroit 10, Michigan. These compact slip-type friction clutches act as automatic shear pin mechanisms and avoid the time and labor required to insert new shear pins.

They are particularly adapted to roller chain drives and are designed to be used in connection with standard Morse Type A plain plate roller chain sprockets. Other types of rotating members such as gears, pulleys and sheaves can also be used with the new clutches.

Morse Standard Torque-Limiting Clutches are especially adapted as overload protection devices in the power drives of many types of industrial machinery including conveyors, materials handling equipment and devices, agricultural equipment, packaging machinery and other related types of equipment where the torque capacity of the drive does not exceed 260 foot-pounds.

BOOKLETS ON WOOD

The most effective method of treating wood with preservatives is by means of pressure, according to Dr. J. D. MacLean, who has done research in this field for many years at the U. S. Forest Products Laboratory.

MacLean describes pressure treating techniques in Agriculture Handbook No. 40, "Preservative Treatment of Wood by Pressure Methods," recently issued by the Forest Service, U. S. Department of Agriculture.

The handbook gives much information of value to engineers, treating-plant operators, inspectors and specification writers. The author points out that pressure treatment, when intelligently applied, results in lower annual cost, more satisfactory service, and less drain on the forest resources. The handbook is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 40 cents.

"Effects of Tension Wood in Hardwood Lumber and Veneer" is the title of Report No. 1943, recently issued by the Forest Products Laboratory. In it Dr. M. Y. Pillow describes tension wood —wood containing peculiar fibers that cause warping and rough machining of hardwood lumber. Veneer that includes tension wood fibers tends to buckle and to have fibrous surfaces. Dr. Pillow discusses ways of detecting tension wood and limitations of its use in manufacturing operations.

A number of common problems concerning "Steam Heating Systems in Lumber Dry Kilns" are discussed in detail in Report No. 1945. The paper, written by E. F. Rasmussen, engineer at the Laboratory, deals with steam heating systems of the pipe coil type.

The two Laboratory reports may be obtained free by writing the Director, U.S. Forest Products Laboratory, Madison 5, Wis.

WOOD LADDERS PREFERRED

Much propaganda has been put out over the years attempting to show the superiority of metal structures and furnishings over wood in the matter of fire safety, but all the arguments in that respect have fallen on deaf ears as far as the Chicago Fire Department is concerned when it affects their own equipment. The fire commissioner repeatedly put in a requisition for wood ladders but active opposition from makers of metal ladders forced the issue to the mayor who insisted that the fire commissioner give him his reasons in writing for favoring the wooden ladders so consistently. Here are some reasons which he gave:

Firemen could be electrocuted if a metal ladder touched a trolley wire.

Wood does not warp under extreme heat, nor snap under extreme cold, as metal sometimes does.

If a wooden ladder burns, the danger can be easily seen, whereas metal can buckle suddenly and without warning when overheated.

Wooden ladders are easier to repair than metal ones.

In cold weather, firemen's gloves or bare skin freeze and stick to metal ladders if wet.

As a result, wooden ladders were ordered without further argument. Here is a good bit of evidence to bring to the attention of your own local fire department—to have on hand when new purchase is being considered. What helps wood helps you!

When in Chicago
Be Sure to Visit the New
HARDWOODS EXHIBIT
"A World of Hardwoods"
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Museum of Science and Industry
57th Street and South Shore Drive

TREATED WOOD FOR LONGER LIFE

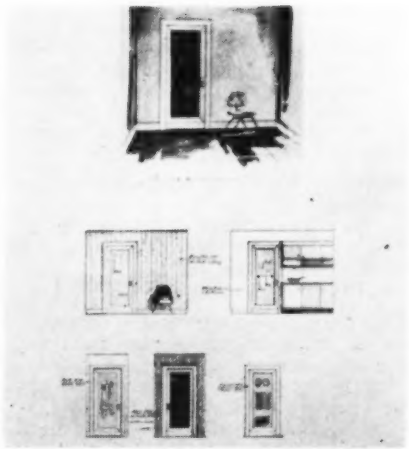
Still in good condition after three and a half years, the gum deck on this

Chicago, Rock Island & Pacific Railroad flatcar is expected to last two to three times the normal four years. It is one of the Rock Island's 1,300 flatcars chemically protected with penta, common name for pentachlorophenol, a wood preservative manufactured by Monsanto Chemical Company of St. Louis.

The chemical, injected into the planks under pressure, prevents decay which ordinarilly attacks wood fibers exposed by spike and bolt holes and abrasion. Such weakening decay permits rapid mechanical deterioration of decks by machinery and other heavy freight usually carried on flatcars.

PRIZE DOOR DESIGN

This is the novel panel door design by Laurence S. Higgins which won a total of $3500.00 in prizes in the "Ponderosa Pine Panel Door Design Competition." Use of perforated board for the main panels permits a diversity of design and functional possibilities.



Perspective at top shows the design in use as an office passage door. Small panels in contrasting color carry tenant and room number identification. Being detachable they may be positioned to suit the designer's fancy.

Where perforated board is used for both inner and outer main panels the scheme calls for unmatched placement of holes to obstruct light while permitting restrained ventilation.

Use of hanging hardware is shown in kitchen, back door and closet elevations, above. Back door outside elevation shows application of a solid main panel in combination with perforated board on inside.

In keeping with competition rules, design details were provided showing that door can be mass produced on existing panel door manufacturing machinery.

"THE WAY YOU WASTE WOOD, JOHNSON, YOU'D THINK IT GROWS ON TREES!"

Of the unspoken word thou art master; the spoken word is master of thee.

—Arabian Proverb

My great concern is not whether you have failed, but whether you are content with your failure.

—Lincoln

"...Well done, AMERICA"

GEORGE M. HUMPHREY
Secretary of the Treasury

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• cash sales of Savings Bonds, all series, during the first four months of 1953 totaled $1,741,273,000—22% above those of the first four months of 1952.

• every month, nearly 8,000,000 Payroll Savers purchase about $160,000,000 in Series E Bonds.

For assistance in installing a Payroll Savings Plan, or building participation in an existing Plan, write to Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D. C. Your State Director will be glad to help you.

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Mechanics Through The Ages

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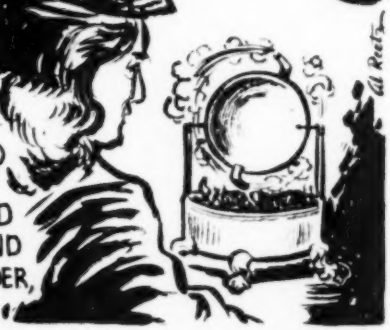
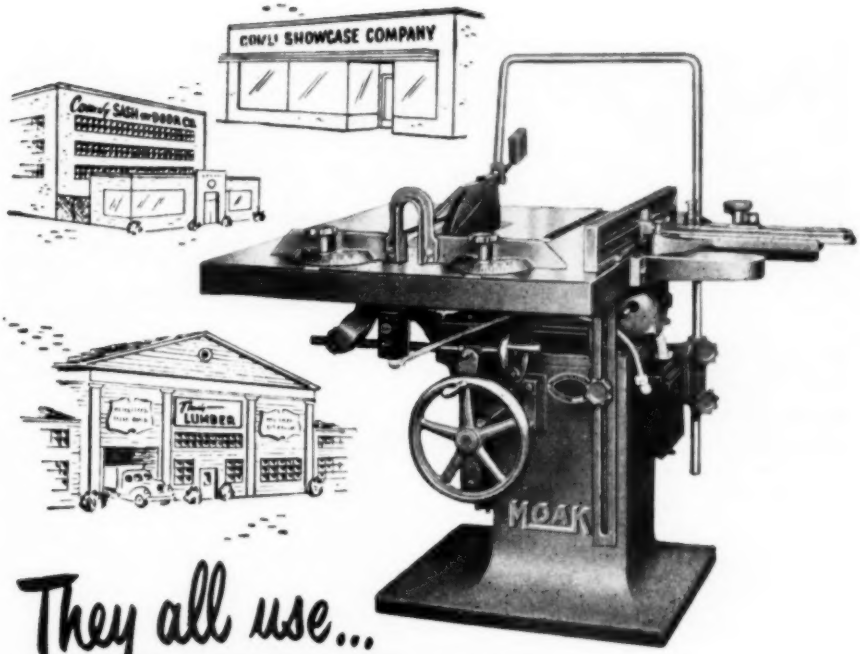
BEFORE THE ADVENT OF THE SCREW VISE AND BENCH CLAMP, SOME MEDIEVAL JOINTERS AND CARPENTERS PROPPED THEIR WORK AGAINST MOVABLE PEGS AND WEDGES; OTHERS WERE SO EXPERT THAT THEY PERFORMED THEIR WORK ON LOOSE MATERIAL.

1500 YEARS BEFORE LEONARDO DA VINCI, HERO OF ALEXANDRIA EGYPT (First Century B.C.) DEVISED A TRUE REACTION STEAM TURBINE, BUILT A HOT AIR ENGINE THAT OPENED AND CLOSED TOY TEMPLE DOORS—AND DISCOVERED THE FUNCTIONS OF CYLINDER, PISTON, VALVE AND VALVE CLACK.





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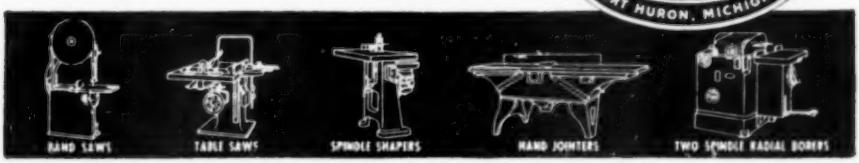
TO CUT BOTH HEAVY MILL JOBS AND FINE SHOP WORK WITH UNERRING PRECISION

Capacity for cutting stock up to 5⅝" thick and accuracy for fine work are both available in this one machine—the Moak No. 16-A All Purpose Saw Table. Functionally designed throughout for efficient operation, Moak Tables raise, lower, or tilt at a turn of a hand wheel. Accurately graduated cut-off gauges adjust in V-slots machined in the polished semi-steel table; rip fence has rack and pinion adjustment. Choose from two models, three drives.

Get the facts on Moak Saw Tables right away. Write for our colorful booklet.

MOAK MACHINE & TOOL CO.
MOAK
PORT HURON, MICHIGAN



to up-to-date information

about equipment and supplies as featured by our advertisers in this particular issue. All of our advertisers will be glad to send information about their products, but we have listed the following firms because they have mentioned booklets in their advertising copy.

AIR COMPRESSORS & CYLINDERS
A. Schrader's Son, page 119, Bulletin.
Hanna Engineering Works, page 168, Bulletin.

BORING TOOLS
Forest City Bit & Tool Co., page 106, Catalog.

CLAMPS
J. L. Taylor Manufacturing Co., page 90, Catalog.
Adjustable Clamp Co., page 122, Catalog.
Cincinnati Tool Co., page 158, Catalog.

CUTTERS & KNIVES
Jones & Orth Cutter Head Co., page 7, Catalog.
Yates-American, pages 16-17, Literature.
G. M. Diehl Machine Works, page 25, Bulletin.
Taylor, Stiles & Co., page 71, Catalog.
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Commander Manufacturing Co., page 159, Catalog.

DRY KILNS
Standard Dry Kiln Co., page 12, Catalog.
Moore Dry Kiln Co., page 40, Bulletin.

DUST CONTROL EQUIPMENT
Kirk & Blum, page 146, Literature.
Aget-Detroit, page 155, Catalog.
Young & Bertke, page 174, Brochure.

FACTORY TRUCKS
Nutting Truck & Caster Co., page 122, Literature.
Jakes Foundry Co., page 172, Literature.
Towsley Trucks, Inc., page 176, Bulletin.

FASTENERS
Southern Screw Co., page 167, Catalog.

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Beverly Manufacturing Co., page 121, Literature.

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Black Brothers, page 6, Bulletin.

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Simpson Forest Products, page 47, Sample, Literature.

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American Pulverizer Co., page 91, Literature.

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Armstrong Machine Works, page 165, Literature.

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Buss Machine Works, page 43, Bulletin.
Goodspeed Machine Co., page 61, Bulletin.
Powermatic Machine Co., page 109, Literature.

PORTABLE ELECTRIC TOOLS
Black & Decker, page 29, Catalog.

PRESSES, PLYWOOD
V. Berthelsen, page 151, Booklet.

RESAWS, BAND
McDonough Mfg. Co., page 171, Bulletin.

SAFETY EQUIPMENT
Willson Products, page 160, Bulletin.

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H. B. Smith Co., page 2, Literature.
Beach Manufacturing Co., page 4, Folder.
National Air Sander, page 20, Catalog.
Sand-Rite Manufacturing Co., page 71, Circular.
Merit Products, page 166, Literature.
Timesavers, Inc., page 182, Circular.
Max Manufacturing Co., page 194, Literature.

SAW BLADES, SAWING MACHINES & EQUIP.
Mereen-Johnson Machine Co., page 62, Bulletin.
L. S. Starrett, page 183, Bulletin.
Heston & Anderson, page 188, Literature.
Moak Machine & Tool Co., page 201, Booklet.

SAWDUST BURNERS
Rees Blow Pipe Manufacturing Co., page 164, Bulletin.

SAW SETTING & SHARPENING EQUIPMENT
Hanchett Manufacturing Co., page 28, Bulletin.
Foley Manufacturing Co., page 88, Booklet.

STAPLING MACHINES
Saranac Machine Co., page 100, Sample, Bulletin.

TABLE EQUIPMENT
B. Walter & Co., page 173, Sample.

WOODWORKING MACHINERY & TOOLS
Woodworkers' Tool Works, page 110, Catalog.
Bass, Rudolf, page 159, Catalog.

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Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of $7.50 for name and address and a five line advertisement. For additional lines, only 75c per line.

DISPLAY ADVERTISEMENTS: 1 inch (Minimum), $8.50; 2 inches, $17.00; 3 inches (Maximum), $25.00.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, 222 E. Willow Ave., Wheaton, Ill. making known your wants on either new or used machinery and the publisher will gladly assist you.

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Frequency changers, 30 KW dmd.
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Mortiser, Greenlee No. 228 Vert. bd. & motor
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Moulder, Amer. No. 35—10" bb. dmd.
Moulders, Mattison No. 222, 6" bb. dmd.
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Moulders, Yates-Amer. C-55—9" bb. dmd.
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Routers, Defiance Sgl. Spdle. High speed, dmd.
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Sanders, Niagara Brush, bb. dmd.
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Sander, Smith 49" 3-drum endless bed, bd.
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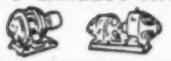

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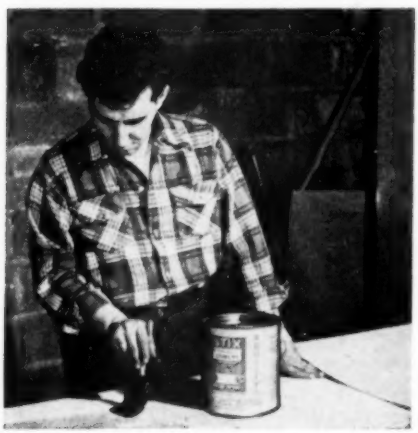

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Berthelsen 36x72" Single Opening, Hydraulic Hot Plate press, Direct motor driven
Dennis veneer taping machine motor-driven
Diehl No. 69 Cont. Feed Ven Joint, d.m.d., b-b.
Francis 28"x115" 16-Screw, Hand Screw Veneer Press
Black 36"x72" Electric Press, direct motor drive.
Merritt 84x54 in. 3-pl. veneer redrier, d. m-d.
Merritt 198" Trav. Head Hyd. Veneer, d.m.d., b-b.

MISCELLANEOUS
Zoller Power Mitre Chopper, m.d.
Mattison No. 231 univ. cutterhd. grdr., d. m-d.
Handy 40" Round Corner Bending Machine, electric heat, air operated.
Curtis 6 ft. auto. rub. machine d. m-d.

FADER REBUILT MACHINERY

FADER WOODWORKING EQUIPMENT QUALITY

Phone: STate 2-7634

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223 N. DESPLAINES ST. • CHICAGO 6, ILL.

REBUILT AND USED MACHINES

BAND SAWS
Tannewitz G 36". Motor Driven
Holladay 36" & 38", Motor Driven
BORERS
Root G300 Heavy Duty Hyd. Vert. Single
Root "GM" Vertical, Single Spindle
Root D210 Hyd. Horizontal Single, H.D.
CARVERS
Porter Ball Bearing Single Spindle
Gallmyer & Livingston Single Spindle
Minnesota No. 308E 16-Spindle Multiple
CLAMP CARRIERS
Taylor 7½' 30-Sec. Chain Type
Taylor 7½' 40-Sec. Chain Type
CLAMPS
Handy No. 15 Portable End Clamp
Handy No. 444, Two-Way Air Clamp
DOVETAILER
Dodds 12-Spindle Spiral Gear
FREQUENCY CHANGER
G.E. 10 KW 60-210 cycles
GLUING MACHINES
Francis No. 3, 12" Hand Feed
Black 5-Gal. Portable Resin Mixer
JOINTERS
6", 16" & 20" Hand Jointers
Diehl No. 60 Cont. Feed Glue Jointer
30" with Billstrom Feed, Attachment
LATHES
Imperial Auto. Turning, D.M.D.
Mattison No. 55C Ball Bg. Auto. Turning
MORTISERS
Wysong & Miles No. 284 P.F. Hollow Chisel
Fay & Egan No. 462 P.F. Hollow Chisel
American No. 20 P.F. Hollow Chisel
MOULDERS
Hermance No. 50—10" Ball Bearing 4-Side
PLANERS
Colladay & Power 24" Single, M.D.
Whitney and Buss 30" Single, M.D.
Whitney 30" Double, 8 feed rolls
SANDERS
Smith No. 401, 42" 3-Drum Endless Bed
Fay & Egan 48" 3-Drum Endless Bed
Sheboygan 49" 3-Drum B.B. Endless Bed
Mattison No. 131 & No. 138 Hand Block Belt
Curtis No. 11 Semi-Auto. Belt Sander
Loeffler 16x24" B.B. Sanding Drum
Wysong & Miles No. 173 Universal Belt
SAWS—CUT-OFF
Porter Floor Type, with Table
Y-A No. C44 Floor Type, with Table
Root & American Double Cut-Off
SAWS—CHAIN FEED
Diehl No. 55 M.D. Chain Feed Rip
Hermance No. 333 Chain Feed Rip
Yates G-2 B.B. Chain Feed Rip
SHAPERS
Porter No. 200 SVM Single, M.D.
Whitney No. 165 D.M.D., Single
Porter No. 155 Serpentine Shaper
Onsrud W-123 Auto. with Frequency Set
TENONERS
Colladay-Power-Fay & Egan Single End
VENEER MACHINERY
Capital 150" Veneer Clipper
MISCELLANEOUS
Woods Lock Corner Box Machine

B. M. ROOT CO., YORK, PA.

MAINTENANCE EQUIPMENT

Precision Equipment Co., 3712 N. Milwaukee Ave., Chicago 41, Ill., has just published a new catalog featuring steel shelving, lockers, as well as other storage and maintenance equipment for industrial and institutional use. This new catalog continues to feature, in the tradition of previous Precision catalogs, the work of nationally famous cartoonists. The new catalog also contains the popular joke column entitled, "Heard In The Locker Room" which adds additional sparkle to Precision catalogs.

NOISE MEASUREMENT

A new publication, the "Handbook of Noise Measurement," has been made available by the General Radio Company, 275 Massachusetts Ave., Cambridge 39, Mass., to replace the well known "Noise Primer." The new handbook, consisting of over 100 pages, covers thoroughly the measurement of airborne sounds, including definitions, standards, measuring equipment, procedures, and interpretation of results.

The authors, Dr. A. P. G. Peterson of the General Radio Engineering Staff and Dr. Leo L. Beranek of M.I.T., are well known in the field of acoustic measurement. Their treatment of the subject is based on many years' experience.

"DIEHLCRAFTER"

Stressing the theme "Sell Wood as the Superior Material," the new issue of the "Diehlcrafter," magazine-type house organ, has been released by the G. M. Diehl Machine Works, Inc., of Wabash, Ind.

Fred A. Collinge, Diehl chairman of board, sets the pace of the issue with an editorial based on the fact that only wood has complete "adaptability to design and purpose . . . appeal to the senses . . . and availability of adequate supply of raw materials for steady production."

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Diehl No. 660 Direct Motor Driven Ball Bearing Continuous Feed Glue Jointer
Root "GMC" Mtr. Driven Vert. Gang Borer; six universal spindles
Root "GM" Motor Driven Vertical Single Spindle Borer
Greenlee No. 228 Motor Driven Vertical Automatic Hollow Chisel Mortiser
Superior No. 145—30" Motor Driven Disc Sander, tilting table
Peerless No. 9 - 14" Vertical Belt Sander, vee belt motor drive
Solem S-3-M 49" Direct Motor Driven Ball Bearing Three Drum Endless Bed Sander
Mattison No. 262—6" Electric Moulder with frequency changer and misc. head equipment.
Vonnegut 6" Electric Four Head Mou'der, hopper feed, rd. hds., jointers
Onsrud W-240 High Speed Electric Router
Yates-American U90 H. S. Electric Router
Ekstrom, Carlson No. 327 H. S. Elec. Router
Diehl No. 75 Direct Motor Driven Chain Feed Straight Line Ripsaw
Mattison No. 207 Direct Motor Driven Ball Bearing Chain Feed Ripsaw.
Mattison No. 202 Mtr. Driven Ball Bearing Chain Feed Ripsaw
Buss No. 4A—30" Direct Motor Driven Ball Bearing Single Cabt. Planer; sec'l. ro'ls, elec. knife grinder
Tannewitz 42" D.M.D., B.B. Band Saw
Yates-American Y36—36" Motor Driven Ball Bearing Band Saw
Porter C43 Motor Driven Straight Line Cut Off Saw
Whitney No. 77 Motor Driven Tilting Arbor Variety Saws
Tannewitz "GH" 36" Direct Motor Driven Ball Bearing Band Saw, demountable rims.
Yates-American G44 Motor Driven Straight Line Cut Off Saw with tables.
Yates-Amer. No. 1 M.D., B.B. Variety Saw
New Britain No. 2 Chain Saw Mortiser, vee belt motor driven
Greenlee No. 356 Direct Motor Driven Vert. Single Spindle Borer
Greenlee No. 165 Motor Driven High Speed Single Spindle Shaper
Whitney No. 134 Motor Driven Ball Bearing Double Spindle Shaper
Whitney No. 295 Direct Motor Driven Double Spindle Automatic Shaper
Whitney No. 24—30" Motor Driven Ball Bearing Double Head Surfacer
Whitney No. 29 - 36" Motor Driven Ball Bearing Single Surfacer
Buss No. 4—36" Ball Bearing Double Sur-facer, vee belted M.D.

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1637 N. LOWELL AVENUE **CHICAGO 39, ILLINOIS**

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Moulder, Yates-American No. C88-8" Electric
Moulder, Berlin No. 108-13x6" Inside
Pocket Cutter & Pulley Mortiser, S&P
Sander Arm, Fay & Egan
Sander, Check Rails, F&E 42"—3 Drum
Planer, Sgl. Whitney, 30"x7" Sq. Head
Sash Clamp, Greenlee No. 602, Quick Acting
Shaper, Dbl. Spindle Buss
Saws, Cut-off Swing and Under cut type
Saw, Rip, Chain feed Yates No. G-2
Panel Raiser, Fay & Egan No. 302 Vertical
Variety Saw, Hall & Brown, Tilt. Table
Tenoner, Dbl. End Jenkins, No. 85-30"x80" Capacity for Sash & Doors, heads and motor
Shaving Exhausters, Sturtevant No. 30 Sgl. No. 40 Dbl.

ALSO FOLLOWING FROM OUR STOCK

Morgan Camera Lock Corner Cutter 3/32" cutter
Onsrud No. W-240 Router, 7½ HP motor
Dodds 12 spindle Dovetailer
Vonnegut 6" Moulder, 48" hopper feed
Crescent No. P-24-24 x 8" Sgl. Planer, D.M.D.
Jointer, 30" Fay & Egan with motor
Jointer, 30" American with power feed attach
Resaw, Band Mershon with motor, New Standard 54"
Surfacer, Dbl. Berlin, 30x8" with motors
Jointers, 12" Crescent, 16" Famous with motor
Band Saw, 36" Fay & Egan No. 50
Planer, Single Hall & Brown 24x8", Belt Drive
Radial Saws, DeWalt, 12 HP motor, 20" Saw
Shaper, Dbl. Whitney with frequency changer
Variety Saw, Fay & Egan No. 500, DMD, 5 HP
Tenoners, Sgl. End American No. 1 and No. 2½ with copes
Yates-American No. T-5-30" automatic Lathes with 175 inches of hds., holders and knives
Tenoners, Dbl End Wilkins-Challoner with copes
Sanders, Hand Block Mattison and Fay & Egan
Nailing Machine, Morgan 8 Track Closed Back, Rebuilt
Sander, 3 Drum F&E No. 225—48" Roll Feed
Sander, 3 Drum Yates No. 431—48" Endless Bed

Send us your inquiry for machines not listed.

McDONALD MACHINERY CO.
1535 N. Broadway **CE 9360** **St. Louis 6, Mo.**

PRODUCTS INDEX

Compiled for quick reference and for your convenience, this handy index of products shows the pages on which you will find the items advertised in this issue. When writing to advertisers, it will be appreciated if you will mention WOOD WORKING DIGEST.

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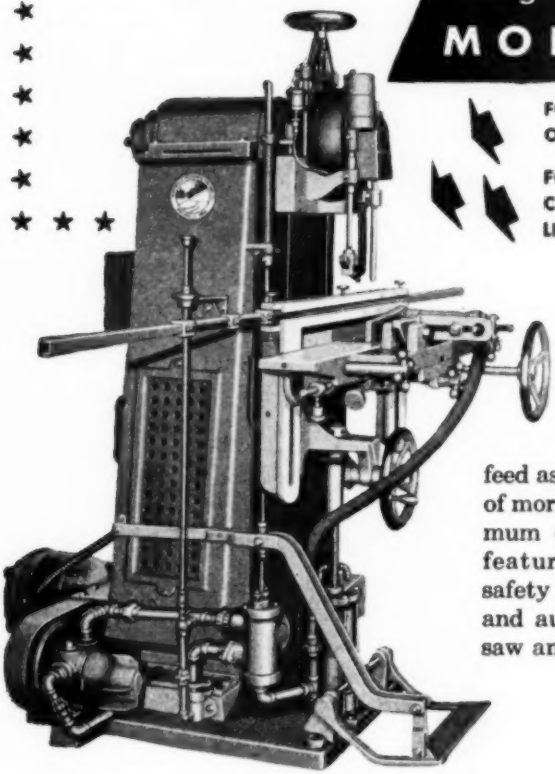
NORTHFIELD
Single Chain Saw
MORTISER

FOR MINIMUM OPERATOR FATIGUE

FOR LONGER CUTTING EQUIPMENT LIFE



THIS MACHINE is soundly designed for peak production, long life and minimum expense. The hydraulic feed assures maximum number of mortises per hour with minimum operator fatigue. Other features include; automatic safety stop, automatic clamps; and automatic oiling of chain saw and guide bar.

The NORTHFIELD Guarantee

We guarantee perfect satisfaction to anyone who may purchase our machines, and if any reasonable exceptions are taken to their good performance, they may be returned at our expense.

HIGH SPEED, PRECISION

- Band Saws
- Surfacers
- Wood Shapers
- Jointers
- Saw Tables
- Mortisers (Chain & Hollow Chisel)
- Universal Woodworkers

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Northfield FOUNDRY & MACHINE CO.

★ ★ ★ NORTHFIELD, MINNESOTA, U. S. A.

August, 1953

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The veneered door shown is being dressed on the edge, and both corners are being eased by using an auxiliary floating spindle in addition to the regular spindle on a double end tenoner. The top head is an "L" Type Badger Groover Disc and the cope spindle head is a Badger Round Head with plug cutters. All cutters are carbide tipped.

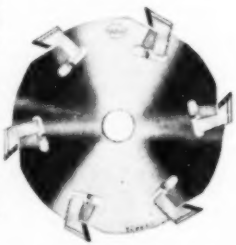
VENEERED DOORS

MEAN GLUE LINE PROBLEMS —JUST THE PLACE FOR BADGER CARBIDE TIPPED CUTTERS!

The machining process shown above is only one of many used in manufacturing veneered doors. Badger Engineers will gladly work with you in determining the arrangement of heads and cutters best suited to work on your machines — whether they be tenoners or shapers. For example, Badger Round Heads can be furnished with double rows of plug cutters so that 1⅜" or 1¾" doors can be handled with the same head equipment by changing the position of the plug cutters. The carbide plug cutters either ease the corners or cut a chamfer with the amount of the ease, of course, being adjustable.

Whether you make doors or baby cribs, see us when you need high production tooling designed for flexibility, lowest maintenance expense — specially engineered to operate on *your* equipment!

"L" Type Groover Disc with carbide tipped cutters



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Engineers to the Woodworking Industry

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J-02258

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FAST FEED

STRAIGHT LINE RIPPER

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14" saw cuts 4" lumber
9" saw cuts 1" lumber

Hardened wear-resisting track and chain blocks.

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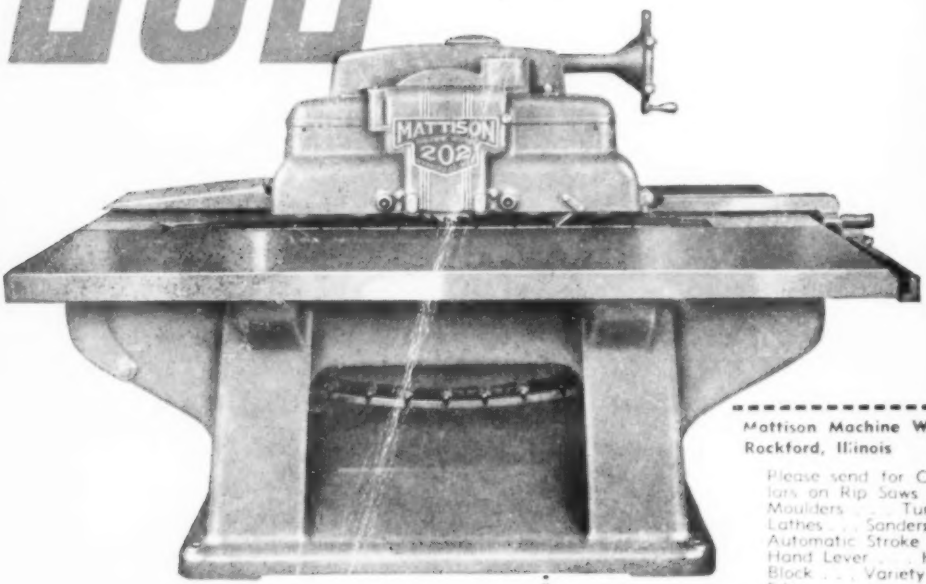
Provides straight-edge accuracy for glue joint work.



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Lathes . . . Sanders .
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